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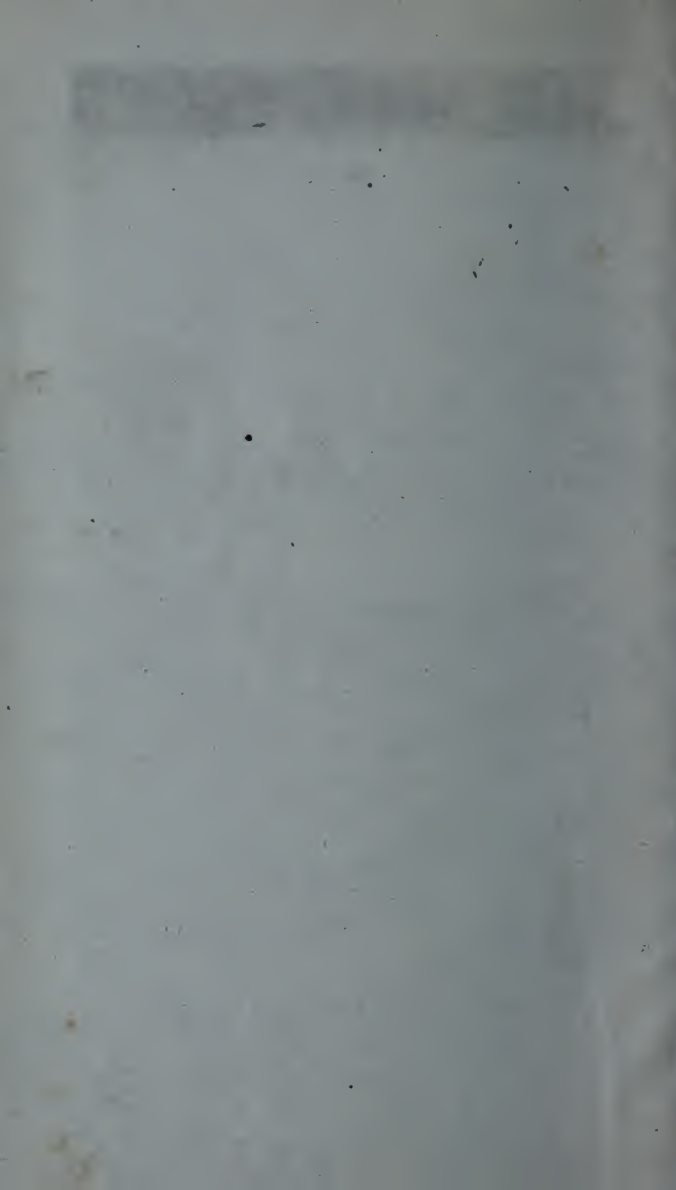
GLASGOW AND THE CLYDE.

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GLASGOW AND THE CLYDE.

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GLASGOW AND THE CLYDE.

BY

ROBERT GILLESPIE,

(*Late Editor of "Evening Star,"*)

AUTHOR OF "ROUND ABOUT FALKIRK."



GLASGOW:

ROBERT FORRESTER, 1 ROYAL EXCHANGE SQUARE;

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1876.

TO

MR JAMES HAY, GLASGOW,

THIS WORK

Is Affectionately Dedicated,

BY THE AUTHOR,

As a Token of Early and Life-lasting Friendship.

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GLASGOW—CITY AND CITIZENS.

No city in the kingdom surpasses Glasgow in street architecture. Liverpool and Manchester are mean-looking in this particular as compared with the Queen of the Clyde. Edinburgh is more picturesque, owing to the peculiar advantages in point of site possessed by the Modern Athens, but there the advantage ceases. The material universally employed is a fine quality of freestone, drawn from several extensive quarries in the neighbourhood. When first erected, it is in colour of a rich, warm, yellowish tint. Exposure to the weather, and to the action of the smoke inseparable from a manufacturing city, gradually softens this down to a cool grey, giving the buildings precisely the effect of a drawing in China ink, and imparting a tone far from unpleasing to the eye. Several of the public structures are sufficiently beautiful and imposing, though, with the exception of the University, scarcely on a scale commensurate with the wealth and size of Glasgow. The Exchange, for example, is a brilliant specimen of Greek art successfully applied to modern purposes, and its effect is heightened by the buildings which surround the square in which it stands being in strict "keeping" with the central structure. The University is a magnificent building, designed by Sir Gilbert G. Scott, and the grandeur of the architect's con-

ception is enhanced by a noble site on a swell of ground rising to sufficient height to render the institution by which it is crowned a prominent object from every point by which Glasgow is usually approached. The city is not rich in squares, nor are those she possesses of large size; but one of them, George Square, is perfect in its way, and is a breathing space of which the citizens may well be proud. It is almost a matter of course now-a-days that large towns should have a West End and an East End, and Glasgow is not original enough to strike out a new idea. The wealthy citizens flock westward, leaving the east for occupation to the *ouvrier* class, who live in convenient proximity to the factories where they gain their bread. Splendid mansions adorn the western streets and terraces, and the sight of these edifices stretching mile upon mile, and evidently held by tenants living at the rate of some thousands a-year, conveys as adequate an idea, perhaps, as could be formed of the wealth and prosperity of the city. The central or business quarter of Glasgow is equally fine with the West End as regards externals, though in a different way. Argyle Street was classed by that ubiquitous observer of men and cities, George Augustus Sala, as one of "The Streets of the World." Sala in saying so was simply repeating Earl Russell, who (then Lord John) declared that Argyle Street was the finest street in Europe. It has lost something of the picturesque semi-antique look it had when seen by Sala, owing to the greater uniformity of its appearance, arising from modern improvements and the consequent want of that broken sky-line which is one of the elements of architectural beauty. Buchanan Street and Sauchiehall Street are, perhaps, entitled to equal admiration, though they lack much of the throbbing life which courses through the main artery of the city. The Banks

and Insurance Offices are all magnificently housed, and seem to vie with each other in the splendour of their external surroundings. Referring to Banks and Banking in Glasgow long ago, Aesica says:—"The present Virginia Street office of the City Bank stands on the site of the once well-known and highly respectable Thistle Bank. It was a two-storey building, with a few steps projecting on the narrow pavement, and leading up to a small door in halves, which opened into a little dark lobby, where several doors were seen, the chief of which was generally left free for the customers getting in, a weight being put on the floor for that purpose. It is the oldest banking site now in Glasgow, no less than five banks having consecutively had their offices there during the last 100 years. Then, when Glassford Street was reached from Trongate, the first prominent object was what had the look of a country jail at the south-west corner. The lower windows, both in Glassford and Argyle Streets, were stanchioned, small, and not overly clean. But this was a bank, and no other than the celebrated Ship, under the charge of Mr Robert Carrick. If the 'Thistle' was queerish, 'The Ship' was more so. In fact, the latter would require the pencil of Hogarth to do it justice. Suffice it to say that you found yourself first in a droll, cold-looking lobby, which would have been none the worse of a besom to dislodge the cobwebs, and a dose of Irish lime on the walls. Branching off this dismal entrance was a narrow, darkish passage, with two doors, one opening to the right, and lighted from Argyle Street; the other illuminated from Glassford Street. The former had a lowish counter like a grocer's, and behind it stood an individual of middle age, in a brown coat with large brass buttons and buff sleeves, to save the garment as far as the elbows. Here bills were paid, and drafts issued.

The opposite door opened into the telling-room, and such a telling-room ! There was no counter, but a small narrow shelf nearly as high as a man's shoulders, all below it being boxed up of wood. People of short stature had therefore to give a sort of jump up to see and be seen. In this room sat Mr Carrick, surrounded by his staff. There was a 'speak-a-word' room off the main lobby, in which a clerk sat writing-up the London and the Edinburgh accounts, with other private matters, and who retired to the lobby till the conference ended. To protect the bank during the silent watches of the night, the youngest apprentice mounted guard inside the office, having a box-bed for repose, and to make security doubly sure, he himself was locked in bodily. He was furnished with a gun, powder-horn, a bag of slugs, a bugle to sound alarm, and a comfortable Kilmarnock night cap. For the important services thus rendered, the handsome sum of twenty shillings was awarded him at the annual balance. When Glassford Street was opened, about 1793, through the garden of Mr Henry Glassford, building-stances were given off on each side. But a considerable stretch of ground was kept vacant immediately behind the old Ship Bank, and enclosed with a high brick wall, the foot-way being causewayed. Generally one or two haystacks were to be seen overtopping the dyke. I believe that this vacant ground was acquired by Mr Carrick. It remained unbuilt at any rate till after his death in 1821, at the age of 84. Thereafter a new Ship Bank was erected on the west side of Glassford Street, and the old bank demolished. The new bank is still standing, and after the Bank left the locality altogether to join another establishment, the office was converted into the Commercial Hotel. The vacant ground now referred to forms part of the property

just acquired by the City of Glasgow Bank for an extension of their premises. This will bring back once more a banking office into Glassford Street, which at one time had two provincial bank offices planted there besides the Ship." Of Churches we have of course ample store, built in every order of architecture, from the classic five to the modern nondescript. The Cathedral was fortunate enough to escape the ravages of the Reformation, and remains a noble specimen of mediæval mason-work. "Slums" we have none. Under a City Improvement Act obtained by the municipal authorities, the vile old rookeries, the haunts and breeding places of vice and crime, have been swept away. The closes are replaced by broad fairly built streets, letting in light and air to the poorest dwelling; while reasonable purity is ensured by an efficient system of sanitary administration. Externally, Glasgow must be regarded as a handsome and well-built city. The houses are solid-looking, substantial free-stone structures even in the poorest quarter; while the wealthier are equalled by few and surpassed by none in any of the towns or cities in the Empire. Then, apart from the city, but still in connection with it, are a series of pretty suburban districts, dotted over with garden-encircled villas, to which well-to-do citizens escape after the money-grubbing labours of the day are over, in search of that pleasant *rus in urbe* life which is so agreeable as a contrast to the busy merchant or manufacturer. In this way, Glasgow is spreading so fast that it has now become about a five miles' journey from the centre of the city, and in some directions even further, before anything worthy of being called country as distinguished from town can be reached. The city is undoubtedly spreading fastest to the west along the course of the river—a circumstance to be attributed to the extraordinary

prosperity of the shipbuilding trade. Partick on the north and Govan on the south, which only a few years ago were separated from Glasgow by an interval of from one to two miles, have already been touched by the process of extension and passed. Whiteinch and Partick are all but continuous, and from the former it is but a step to Dalmuir. Indeed the bridging of the intervening space has already been begun, by the erection of a large shipbuilding yard, with workmen's houses lining the road. The same process is going on upon the south bank below Govan. Shipbuilding establishments are travelling fast downwards, driven from their old locations by successive additions to the harbour space. But although down the Clyde is the main line of extension, north, south, and east the city is moving ever onwards and enlarging her boundaries. The builder is never idle. Go to the outskirts where you will, and new structures are to be seen rising, range after range, with material of every description lying about in seeming confusion, giving the outlying quarters that strange half-finished, cheerless look which is the prevailing characteristic of the limits of thriving communities. Unfortunately there is no prominent point from which an adequate idea of the size of Glasgow can be gained at a bird's-eye view. The University Tower in early morning, before the smoke from the thousand and one factory chimneys obscures the atmosphere, is perhaps the best post of observation; but even from it the vast extent of Glasgow is scarcely visible. To see the city properly, its streets must be traversed; the East End, with its factories and artisan dwellings; the Centre, with its public institutions, warehouses, offices, and shops; the West End, with the residences of the rich; the Harbour, miles in extent and crowded with shipping, and the river banks for

miles below with shipbuilding yards resounding with the harsh clank, clank of the rivetting hammer.

But Glasgow has had its seasons of bitter adversity. In 1649, a dreadful famine and plague all but desolated the town ; while in 1652, and again in 1677, it was well nigh ruined by fire. At this period, the houses for the most part were built of timber, and so great was the havoc done (£100,000 of property destroyed) by the first conflagration, which raged for 18 hours, that the inhabitants were compelled to apply to other towns for relief. In 1695, however, when the magistrates could afford an allowance to the jailor for keeping warlocks and witches imprisoned in the Tol-booth, we find Glasgow rated as the second burgh in Scotland in point of wealth. Saltmarket was one of its earliest streets, having been formed in 1484 to give a ready access to the river. Fishersgate, now known as Bridgegate, soon followed; but it was 1790 before Wilson Street, Brunswick Street, and Hutcheson Street were built—the year in which the first London Mail Coach, *via* Carlisle, came to the town. Glassford Street was opened in 1793, about 70 years after the formation of Anderston, as a village, and 25 years after Finnieston had been laid out. Prior to 1777, Queen Street, originally known as the “Cow Loan,” was a narrow country lane, bounded by hedges, through which the common herdsman of the burgh was accustomed to drive the cattle of the citizens on their way to the pastures beyond the present Dundas Street. Cowcaddens, about 45 years ago, was composed of a single street or road, surrounded by large clay-hills.

The interior of your wealthy Glasgow merchant's residence is now-a-days the abode of taste and refinement. You shall find on his walls well selected pictures from the studios of

famous artists. The appointments of his rooms are all in strict artistic keeping, from the tint on the walls to the colour of the carpet and the shade of the hangings. His house and its furniture bear throughout evidence of careful study in adapting means to an end, and every little arrangement has been dictated by a sense of artistic propriety. His wife and daughters cultivate music and are capable of criticising Wagner and the music of the future. His sons know all about "Shakespeare and the Musical Glasses," and are as deft as so many Guardsmen in the intricate science of small talk. He himself is well read in English literature probably, and may astonish you at times by making an apt quotation from a half-forgotten poet. His table is admirably served, what with delicacies procurable only in town and fresh produce from his "little place in the country," or his villa at the coast, where his garden or semi-farm would, in many cases, do no dishonour to the mansion of a peer. Vulgar merchants—commercial *parvenus*—there always have been, and always will be, but they are happily in the minority. They are not current coin in the upper circles of Glasgow society, and strive as they will, assert themselves as they please, they have always an indescribable air of being but jackdaws tricked out in peacock's feathers. Beneath the merchant prince order, there is another class of equal worth in the persons of the manufacturers who have yet to achieve independence, and of the respectable shopkeepers doing a comfortable business and steadily accumulating wealth by the safe process of saving money. These lead quietly-domesticated and very happy lives, though the circle of their enjoyments is rather narrow. Carefully attending to business from day to day, they find their chief happiness in their homes and among their children. Luxury is not theirs,

but comfort is, in a pre-eminent degree. Their boys and girls are well taught in good schools, and brought up under the strict but affectionate supervision of a careful mother. When the boys are sufficiently advanced, Paterfamilias has their assistance in his business; while when he comes home of an evening fatigued by his day's work he can have the solace of music from his girls. This class is pleasantly sociable in its ways, and forms little sets who exchange visits without formality after the day's work is over, and discuss the affairs of the city, and the country, and the state of trade over a modest tumbler. The chief relaxation of its members is a sojourn at the coast, or in the country, for a month or two during the summer season; but even then the anxious Paterfamilias is chary about relinquishing the cares of business, and, as a rule, he goes to town by rail or steamer, or both, returning in the evening for a stroll along the beach where he refreshes his lungs with the invigorating sea air, or for a walk along a pleasant rural road where the sight of "fresh woods and pastures new," the sound of lowing cattle driven home at milking time, and the rustle of the soft wind among the trees soothe his brain fatigued with work and reanimate him for renewed exertion. Beneath the shopkeeping class, we touch the working man; and he may be divided into two species—the orderly and the disorderly. The latter in Glasgow are in a distinct minority, the rule being that the Scottish artisan is well doing, industrious, and tolerably sober in his habits. Of late years, the briskness of trade has produced a marked change in the workman's position and mode of living. His wages are higher, and his hours of labour are shorter; and the well-behaved have turned both advantages to good account for themselves and their families. In 1777, we find the mechanics of the city paid, upon an

average, at the rate of 7s per week ; and at this period house rents ranged from £1 10s to £60 per annum ; beef sold at from 4d to 7d per lb. of $22\frac{1}{2}$ oz. ; eggs at from 3d to 7d per dozen ; butter 6d to 9d per lb. of $22\frac{1}{2}$ oz. ; cheese 2d to 6d per lb. of $22\frac{1}{2}$ oz. ; salt herrings, $4\frac{1}{2}$ d per 100 ; and salmon, 1d to 3d per lb. English. But if rents and provisions are now considerably higher, present wages, as we said, nevertheless allow the artisan's household to live in a style to which they were formerly strangers. They have comforts and even luxuries at their disposal. They are better clad and better housed than they were formerly, and wife and bairns as well as father can afford to spend a week or two at the "saut water" during the season. In town, they have a Free Library for purposes of either amusement or instruction. There is a Mechanics Institute, and lectures are frequent during the winter in various institutions. Concerts at a cheap rate are given in the City Hall every Saturday evening, and entertainments of the same class are repeatedly produced in other districts. Then, of course, there are the theatres and music halls which are freely patronised, though it is a singular fact that it is impossible to fill the boxes of the former unless during the brief season of Italian Opera. A most interesting history could be given of Thespian enterprise and its results in Glasgow. Our first theatrical performances took place in 1750 in a hall on the east side of High Street, a short distance below the Bell of the Brae. But, two years later, a timber shed was erected specially for stage representations in the north quarter of the town, adjoining the wall of the Bishop's Palace. In this booth the celebrated Digges, Love, Stampier, and Mrs Ward performed. At that time, however, public prejudice was so strong against amusements of this nature that dress parties from the lower parts

of the town had to be regularly escorted to the theatre by a military guard. In 1754, the booth was levelled to the ground by a congregation under the influence of George Whitefield who denounced it as the "Devil's House." A second theatre was built in 1764, in the Grahamston district, by Mr John Adam, architect, &c. ; but on the opening night, when Mrs Bellamy and other performers appeared, a mob set fire to the stage and completely cleared the place of its machinery, scenery, and ornaments. Another—and what is said to have been the most magnificent provincial theatre in the Empire—was opened in 1804. The house was situated in Queen Street, and cost upwards of £18,500. Its form was that of a parallelogram, the front being composed of an arcade basement, supporting 6 Ionic columns, 30 feet in height, with corresponding pilasters, entablatures, and appropriate devices. Again, however, the community did not fully patronize the lessees ; and they consequently failed to meet their engagements. The annual rent to Messrs Jackson & Aitken was £1200, but to a following tenant it was reduced to £800, and latterly to £400, yet not even then did the business pay expenses. At present, Glasgow has four theatres—the Royal, the Gaiety, the Prince of Wales, and the Globe. Messrs Glover & Francis, by their able management of the first-mentioned house, have won alike the respect and favour of city playgoers. The Gaiety, an exceedingly elegant and comfortable little theatre, is also popular in the hands of Mr Bernard, who never fails to secure an encouraging share of public support. The Prince of Wales, however, notwithstanding a variety of efforts for its resuscitation, is still "out in the cold ;" while the Globe, in the east end, may be said to be only on its trial.

In the Trongate, there is an extensive menagerie and wax-

work, conducted by the Messrs Macleod. This establishment, which was started by these brothers in 1862, is, as it well deserves to be, largely patronised—a favourite resort especially of country people and children. The father of the proprietors was, some 35 years ago, a well known citizen in Crown Street, whose grotto with its wonderful shell manufactures, and museum of artificial and natural birds was, in its day, one of the city sights.

Thirty years ago, Glasgow was devoid of music of a high class. The first step towards advancement in this art was the establishment of the Choral Union, under the conductorship of Mr J. Seligmann, whose place was taken a few years subsequently by Mr H. A. Lambeth. This association was poorly supported for many years, and its present prosperous position is due entirely to the enthusiasm of a body of local amateurs and the never failing energy of their conductor, who is undoubtedly the ablest chorus master out of London. Up till the present day, Glasgow, unlike Edinburgh, is a mean supporter of professional music. A resident orchestra was formed in connection with the Choral Union two winters ago, but at the end of the first two seasons proved a serious loss to the gentlemen who guaranteed the enterprise. Despite this, however, they still continue the orchestra, which consists of members of the Royal and Her Majesty's opera-companies, along with other well known musicians from the metropolis. On the other hand, the city liberally supports amateur concerts; hence our many vocal associations of that class. The principal one at present is the Hillhead Society which is ably conducted by Signor L. Zavertal. Next come, the St. Vincent Street U. P. Church and the Bothwell Societies, both of which are under the care of Mr H. M'Nab. Last season, an association was also successfully formed a

Lenzie by Mr J. A. Robertson, organist of Dowanhill Church, who is well known in Glasgow as an enthusiastic amateur. There are many smaller societies of the same sort in and around the city—one being connected with almost every church and suburban district. Glasgow also owns an amateur orchestral association, which has been in existence for several years. This society has done good work in the cultivation of instrumental music, and is, we are glad to say, making rapid progress.

For out-of-door recreation there are four public parks, measuring in all $361\frac{1}{2}$ acres. In these the orderly working-man, his wife, and his bairns, or his sweetheart, is fond of parading on Sunday dressed in his best; and a very respectable looking personage he has become since he has got over the hallucination that a "claw-hammer coat," as he terms it, is an indispensable article of out-of-door apparel on "high days and holidays." In his case the elevation of the masses has distinctly begun, and the process will extend as the new system of education begins to tell. The disorderly working man is a poor creature. Drunkenness brings him every now and then to the bar of the police court, either for being absolutely incapable, actively aggressive, or for beating his wretched wife. He is a thoroughly "bad lot," and seldom makes even an effort to raise himself from the slough into which he has fallen. Society could endure his own loss without feeling too much aggrieved, but his wife and children, or any other dependents he may have, are much to be pitied. Lowest of all stand the criminal and vicious classes. These are far too numerous not to be an ugly blot on the fairness of our social fame, and there is not much comfort to be derived from the consideration that we are not worse off in this respect than other cities of the same

size. Both vice and crime, however, are fairly kept in check by the vigilance of an active police. The population, as is the case in Liverpool, contains a large Irish element. This is estimated at from a fifth to a fourth of the entire community. But the Irish abroad seem to differ materially from the Irish at home. In Glasgow, they are remarkable chiefly for their steady industry, and they are just as peaceably disposed as the Scots among whom they live. It is quite astonishing to find how many succeed in establishing themselves in business as small dealers, and how often they thrive in pursuing avocations in following which a Scot or an Englishman would never be able to keep his head above water. Numbers find Glasgow a sort of El Dorado, in which they acquire a sum of money equal to a fortune in their estimation, and return to the Green Isle to settle down in comfort with the battle of life more than half won. Sufficient has probably been said to show that the present inhabitants of the city are no unworthy successors of those who began and who continued the measures which have made Glasgow flourish. The community is as sound at heart as ever, and seems to present no symptom indicative of decay. If we keep Sunday a little too strictly, according to the views of our fellow-subjects in the South, they cannot say that they find us on that account less acute in business during the week. But looking at the severity of "ancient manners," we have certainly little now in that direction of which to complain. About the close of the 16th century, we find the beadles ordered to have staffs for securing quietness in church; while the women were prohibited from sitting on the same forms with the men, and had either to sit "laigh" or bring stools with them. Even in 1750, the citizens were prevented by authority from

walking on the Lord's-day; nor were any of the public lamps lighted on that evening, as nobody was expected to be out of his own house after sunset. About 1771, the inhabitants were so strict in their attention to public and private worship, that strangers, in passing through the streets in the evening, and hearing innumerable psalms of praise issuing from the commonest doors, were apt to imagine themselves in church. The faith and religious habits of the people were intensely sincere, if something too gloomy and austere; and although noble men and women were reared under that stern system, no one can regret that it has felt the touch of a more enlightened and genial spirit.

GLASGOW—ITS COMMERCIAL RISE AND PROGRESS.

WHAT the Nile was to Egypt, the Clyde is to Glasgow. It is the source in a large measure of that prosperity which has raised, in recent years, a town once of comparatively minor importance to the lofty position of "Second city in the Empire." Without the access to the sea afforded by the river and the noble Firth into which it expands, Glasgow would never have obtained the pre-eminence she now enjoys in spite of the not unworthy rivalry of Manchester and Liverpool. By the latter, she is excelled as a port for shipping; and by the former, as an emporium for manufactures; but Glasgow is both a great port rapidly becoming greater, and a manufacturing city fast widening her boundaries in every direction, and in thus uniting the leading characteristics of her two rivals she surpasses both in her claim to priority of rank. The question has often been raised by city quidnuncs as to whether Glasgow "made the Clyde, or the Clyde made Glasgow;" and much after dinner talk has been expended in endeavouring to arrive at an acceptable solution of so knotty a point. Perhaps the only possible answer must take the form of a seeming paradox and be given as "neither and yet both." Glasgow would never have been what it now

is had it not been for the Clyde ; while the Clyde would never have been what it now is had it not been for the energy, enterprise, and foresight displayed by the citizens of Glasgow. A third element might be introduced, for it may be added with all truth that neither the Clyde nor Glasgow would be what they now are were it not for the vast mineral fields which lie north and south of the river, and which yield such ample and unfailing supplies of the backbone of civilization—iron, and of coal the material from which is drawn the nervous power to vivify that backbone.

In the beginning of the century, the space covered by Glasgow might be estimated by the square acre ; it may now be measured by the square mile. A population of 4,500 in 1560, of 7644 in 1610, of 14,000 in 1707, of 77,000 in 1801, and of 185,000 in 1829, has grown to over 600,000 in 1876. No such instance of rapid advance is to be found either in this country or on the continent of Europe. To find a parallel we must cross the Atlantic and go to Chicago. This enormous increase in population is based on the success of no particular branch of industry. Manchester is built on cotton bales ; Liverpool is a seaport and little else ; and Birmingham and Sheffield rely for prosperity on the demand for hardware. But the general welfare of the citizens of Glasgow depends on no single trade or manufacture, and hence the uninterrupted career of success run by the city. One or more of the trades or manufactures may suffer from depression for a time, but the shortcoming is usually redeemed to a large extent by the briskness of others. It would be much easier to say what is not manufactured in Glasgow than to say what is. During the 15th century, the only industry carried on by the inhabitants was fishing in the Clyde ; and in 1420, we find a Mr Elphinstone engaged

in curing and pickling salmon which was exported to the French market. In 1667, a company was formed for carrying on the trade of whale fishing, together with the manufacturing of soap. The former business, however, proved unsuccessful, and it was abandoned by the partners of the concern after the total loss of their capital. With the soap, they were more fortunate. This manufactory, in the course of years, became very extensive ; and not until 1777, when the works were partly consumed by fire, was the trade given up. In 1669, a sugar baking business was started ; and, about the same time, a tan work and a rope work ; while about 60 years later we have the manufacture of green glass bottles and delf ware established. But the dawn of Glasgow's commercial prosperity undoubtedly set in in the early part of last century with that Virginia trade, which has given a name to one of the streets, having in its day an aristocratic reputation. Vessels chartered for the purpose were sent to America laden with goods and brought home tobacco in return. The trade grew, the merchants throve and got into such a position that they could purchase vessels instead of merely chartering them ; and in 1718 the first vessel belonging to Glasgow crossed the Atlantic, and inaugurated the direct transatlantic trade with the Clyde, which has since grown to such dimensions. Owing to their industry, frugality, and enterprise, the Glasgow merchants were able to undersell those of Bristol and Liverpool, and other English towns. The latter, jealous to bitterness, invoked in succession the aid of the Customs authorities, the Lords of the Treasury, and Parliament itself, accusing the Glasgow dealers of fraud. An investigation was instituted, with no better result for the English than a finding that the complaints were "groundless, and that they proceeded from a

spirit of envy, and not from a regard to the interest of trade or of the King's revenue." In spite of every attempt to injure it, the trade grew and flourished exceedingly until the outbreak of the American War of Independence, when it received a shock from which it was long in recovering. But the inventions of Arkwright and others; and the rise of the cotton manufacture, soon brought compensation. The cotton trade of Scotland is now all but concentrated in Glasgow and its neighbourhood. Somewhere about 1725, the manufacture of linens, cambrics, &c., was introduced; in 1742, a printfield was fitted up at Pollokshaws by Messrs Ingram & Co.; in 1793, the powerloom came in; and in 1816 there were no fewer than 52 cotton mills, 18 weaving works, 18 calico printing establishments, and 17 calendering houses belonging to the city. At present the establishments for weaving and spinning are on the most splendid scale, and give employment to between 30,000 and 40,000 persons, the number varying according to the state of trade.

Nearly everything that can be done in iron is done, from such undertakings as forging a shaft for the Great Eastern—a work of such magnitude as to be declined everywhere else—down to casting the pot in which Tom, Dick, and Harry have potatoes boiled for dinner. There are actually half-a-dozen blast furnaces within the municipal boundaries, and coal and ironstone pits are everywhere at the city outskirts. Glass and stoneware are included in the list. There are woollen and carpet factories, extensive calico-printing establishments, and till lately there was a silk factory, the latter having unfortunately been destroyed by fire in 1874. The largest chemical work in the world is situated in the St. Rollox district, and not far distant from it is a

second very little inferior in size ; while, if there be any merit in such a matter, the chimneys of both are the loftiest erected hitherto either at home or abroad. Enterprising commercial men refuse to allow Dundee any longer a monopoly of the jute trade, and the manufacture has been introduced here with considerable success.

The community which has accomplished such feats as those we have narrated must necessarily be an energetic race, full of enterprise, and possessed of the capacity for giving practical effect to the projects formed by sagacious men. For nearly 200 years Glasgow has never been wanting in ambitious merchants able and willing to push commerce to the world's end. Last century she had "tobacco lords," a sociable, hearty tribe, who loved rum punch, and "made it twelve o'clock" with undeviating regularity, but who never neglected business. Subsequently she had cotton lords and iron lords, and she has them still, and many another class of merchant princes besides. The times have changed, however, since the jovial era described so graphically and genially by Dr Strang in "Glasgow and its Clubs"—a pleasant book, rich with a quaint flavour of the past. Rum and tobacco rule no longer at the social board. The wealthier classes of Glasgow are men of culture, with a relish for the finer vintages of France and Spain, and this little characteristic means much. It means for one thing that they have broken completely with the rougher and somewhat Homeric manners and customs of their forefathers, and that although they may still betray some traces of the British Philistine, they are striving as best they may towards Mr Matthew Arnold's "sweetness and light."

Brief as our remarks must be regarding the commercial development of the city, there is another art, or trade as it

may be called, which claims special notice. We refer to book printing, which was introduced into Glasgow, in 1638, by George Anderson, who afterwards settled in Edinburgh. Robert Saunders succeeded him in 1661, and held the business till 1730, when Robert Urie took it up, and in correctness of text and beauty of typography greatly surpassed his predecessors. In 1740 the Brothers Foulis, under whose auspices the first Fine Art Academy was established in Scotland, were appointed Printers to the University. Men of genius, taste, and literary enterprise, these brothers—Robert and Andrew—carried on for thirty years a brilliant trade in printing, during which period they issued a series of Greek and Roman classics in a style of elegance and accuracy which had then no parallel in the kingdom. One of these was a 12mo edition of Horace, of the correctness of which they were so confident that the sheets as they emanated from the press were proudly suspended in the College, and a premium offered to the student who should point out an erratum. Three errors, however, were soon afterwards discovered in the work by Duke Gordon, librarian of the Edinburgh University. Printing establishments are now to be found in almost every street of the city, and the leading publishers, from the work they turn out, certainly maintain the high character which had been formerly associated with their important art.

As stands the city in its rental, which, for 1875, was £3,000,000, so do we find the river in its revenue. The two go, as they have ever gone, hand in hand in channels of striking progression. Successive generations of Clyde Trustees have had the gratification of witnessing the energy with which they threw themselves into the work of improving the navigation bring an ample reward. Their labour has,

from the first, proved remunerative to a degree exceeding all anticipation. The more money they expended the larger grew the returns, a sure token that the outlay was well considered and judiciously managed. From 1770 up till the close of the financial year on 30th June, 1872, the sum total of moneys paid away reached the extraordinary amount of £5,594,981 14s 8d. The Trust is burdened with a debt of some two millions and a half, but the burden is easily borne with a revenue rapidly rising year by year, and with not the slightest symptom of decline perceptible. Then, for additional works as they may be wanted, the Trust may draw upon an unexhausted borrowing power of nearly two millions. By way of counterbalance to the expenditure noted, we have a revenue from July, 1752, till the 30th June, 1872, of £3,586,053 14s 4d. The rapidity of the increase of these tonnage and harbour dues is strikingly shown by the figures at decennial periods :—

1770	.....	£147	0	10	1830	.....	£20,296	18	6
1780	.....	1,515	8	4	1840	.....	46,536	14	0
1790	.....	2,239	0	4	1850	... ..	64,243	14	11
1800	.....	3,319	16	1	1860	.....	97,983	18	1
1810	... ..	6,676	7	8	1870	.....	164,093	2	10
1820	.....	6,328	18	10	1874	.....	192,127	16	11

The outlay in 1874 was £173,091 7s 4d, which was expended as follows :—Ordinary expenditure (including dredging) for maintenance, £64,733 1s 5d; interest on debt, £95,075 3s 2d; ground annuals and feu duties, £13,283 2s 9d; leaving a surplus of £19,036 10s 7d. This surplus was employed in defraying the expense of operations at Plantation Quay and Sheds, Stobcross Docks, graving docks, purchase of land, &c. The total expenditure for 1874 on “New Works” reached £301,962 14s 4d; but from this the surplus and compensa-

tion, amounting to £41,536 10s 7d, falls to be deducted, making the nett excess of expenditure £260,426 3s 9d. The revenue for 1875 was £196,000, and the ordinary expenditure £171,000, of which £55,500 was for working expenses, £103,000 being for interest on debt, and £12,500 for ground annuities and feu duties, leaving a surplus of £25,000. The total expenditure on New Works during the year was £236,500. Despite the great depression of trade that has prevailed of late, the income for 1875-76 has exceeded that of the previous year by £2104—a result which, under the circumstances, is simply marvellous. No statement of the expenditure has as yet appeared, but it must have reached close upon £250,000. An outlay of this magnitude demonstrates surely that the Trustees are doing their part to silence the outcry raised by shipbuilders and shipowners some time ago regarding deficient accommodation. Such distinguished authorities as Mr J. F. Bateman, F.R.S., and Mr G. R. Stephenson have recently spoken in flattering terms of all connected with the management of the river; and of this commendation, publicly given, both the Trustees and the gentlemen who serve them so admirably may justly feel proud.

THE RIVER.

BEFORE proceeding further, let a glance be taken at the source and upper surroundings of the Clyde. Formed by the junction of the Daer and Powtrail, at a height of about 900 feet above sea level, the river in its descent receives a variety of streams from the mountainous district of Crawford and Crawford-john. The Midlock, Camps Water, the Glengonner, and the Duneaton all considerably augment it, and on reaching the upper part of the parish of Leamington, the Clyde is by no means an insignificant stream. The hills around Elvanfoot belong to the same general age as those of the Northern Highlands, but the scenery here is peculiarly different from that conventionally associated with mountains. What a marked contrast is presented by these long and gently-swelling slopes, soil-covered even to their summits? After a passage along the Biggar Valley, the river slowly glides in a serpentine course around the roots of Tintoc, and in its windings for many miles flows through a track of beautiful meadows and richly cultivated banks. Its waters, as they roll over a bed consisting of hard gravel with occasional rocks, are clear and deep; and the stream only resumes its former appearance on approaching the parish of Lanark. Tintoc—the hill of fire—was no doubt so called from its having been used as a beacon to alarm the

country in times of hostile invasion. Upon its summit, a great cairn has been erected throughout the course of years; while at its base are two circles formed of large stone pillars. Here also is an artificial mound. The adjacent farm—Sheriff-flats—was probably the spot where the Sheriff was accustomed to hold courts of justice. On being joined by the Douglas Water—a stream whose course of 16 miles dates from the earliest elevation of that district—the Clyde, rarely sluggish, assumes a somewhat rapid current, and flows between high wooded banks as it approaches the celebrated “Falls.” The first of these is Bonnington Linn, where the river descends 30 feet; and below this it has worn a path through the sandstone rock, by which it is confined for half a mile to Cora Linn, the finest of the Falls. It is 84 feet in height, being a series of three falls; and the raging water, towering rocks, and overhanging trees form a scene of rare magnificence. A little below is Dundaff Linn, a few feet in depth, near which is the rock known as “Wallace’s Chair,” and assigned by tradition as one of the hiding-places of that hero. Further on, the Mouse enters from the right, and beyond it is Stonebyres Linn, where, in three leaps, the river descends 80 feet, the scenery being exceedingly fine. From the beginning of the Falls downwards, the face of the country for some miles is considerably altered. The basaltic or whinstone rock begins to terminate, and horizontal strata of freestone frequently occur. At length, in its course to Bothwell, the river gradually expands; and getting rid of steep and rugged rocks, it flows over a finely pebbled bed through low verdant holms, and again between sweetly sloping banks diversified at intervals with coppice wood and orchards. The principal affluents here are the South Calder—a stream distinguished for the picturesque beauties of its

banks—and the Avon, which rises on the confines of the parish of Sorn in Ayrshire. From Bothwell Bridge—the scene of the defeat of the Covenanters by the Duke of Monmouth in 1679—the banks on both sides are lofty, and richly adorned with wood. Reaching Blantyre, the river flows between the remains of the Priory on the left, and those of the Castle on the right, taking a fine sweep round the latter, which is one of the most magnificent ruins in Scotland. Beyond Uddingston, the banks become low and level, and having received the North Calder and the Rotten Calder, the Clyde, after a most romantic course of about 50 miles, passes Carmyle, Cambuslang, and the ancient burgh of Rutherglen. Rutherglen, need we say, was once a sea-port town—in fact was, at one time, the only town of mercantile importance in the valley of the Clyde. Glasgow, too, appears to have been within the bounds over which Rutherglen claimed jurisdiction. There is a charter in existence, bearing date 1226, whereby a grant is made to the Bishop of Glasgow and his successors, that no toll or customs shall be levied in Glasgow by the inhabitants of Rutherglen. “*Ne Præpositi, vel Ballivi, vel Servientes Nostri de Rutherglen, tolneum, aut consuetudinem capiant in Villa de Glasgu sed illa capiant ad crucem de Schedenston (now Shettleston), sicut illa antiquitus capi solebant. Quare prohibemus firmiter ne Præpositi, vel Ballivi, vel Servientes Nostri de Rutherglen, tolneum aut consuetudinem capiant in Villa de Glasgu.*” (Anno 1226.) How Rutherglen came to lose the right of levying custom, or dues, on articles sent to Glasgow for sale is not now known. Equally strange, too, is the spiritless conduct of the burgh with regard to the loss of the free navigation to their ancient quay. The bridge which here extends across the Clyde,

between the lands of Barrowfield and Shawfield, was built in 1775 at a cost of £1800.

In former times, the castle of Rutherglen was considered one of the most important of Scottish fortresses. It was kept in good repair until shortly after the battle of Langside, when it was burned by order of the Regent, out of revenge against the family of Hamilton, in whose custody it then was. One of the principal towers was, however, soon repaired, and became the seat of the Hamiltons of Eliston, lairds of Shawfield. At length, on the decline of that family, it was, about two centuries ago, left to fall into ruins, and by frequent dilapidations was soon levelled with the ground. A kitchen garden latterly occupied the site of the fortress, while several carved stones belonging to the castle were built into dykes adjoining the town.

The kirk of Rutherglen is also a very ancient and interesting edifice. The oldest part of it was 62 feet in length, and 25 in breadth. It was in this place of worship that a peace between Scotland and England was concluded, 8th February, 1297, and where Sir John Monteith contracted with the English to betray Wallace.

We now come to the Weir. This barrier to the flow and action of the tide in the upper reaches of the river is, however, at length to be removed. The original object of its erection was to preserve the foundations of the bridge built in 1775 across the Clyde opposite Jamaica Street. But, in 1781, the dam was condemned by Mr Golborne as being injurious to the navigation and interests of the river generally, and this has been the expressed opinion of many eminent engineers down to the present time. Latterly, the obstruction has been maintained simply for the advantage of certain manufacturers, who claim a vested interest in it on account of the

water supply necessary for their works. Compensation will be given these parties by the erection of new Water Works on the lands of Westthorn, which are situated $4\frac{1}{4}$ miles above Glasgow Bridge, and $3\frac{1}{4}$ miles below Carmyle. The portion of the works to be erected at present, at a cost of from £50,000 to £60,000, will be capable of supplying $7\frac{1}{2}$ million gallons a day, and of this quantity 5,750,000 gallons will be reserved for the manufacturers and others who opposed the removal of the weir, for which they will be charged at the rate of 5s 6d per 100,000 gallons. There can be no question about the advantage to be gained by the demolition of such a barrier. For years it has not only cost the conservators of the Clyde great expense, but has given them great annoyance. And why should it not be forthwith removed, preventing as it does the upward flow of an area of tidal water of the extent of 42 acres, 8 feet deep? This additional quantity of water would certainly sweeten the river; while the reflux would scour and improve the navigable channel, and save considerable expense in dredging. Possibly the amenities of the Green, and the aquatic recreations enjoyed at that part, may to some extent suffer by the removal of the dam, as free scope will thereby be given to the upflow of the offensive sewage which renders the harbour, in the summer season especially, so intolerable in its sickening stench; but with the River Pollution Commissioners may be safely left the early purification of the Clyde. At any rate, we have sufficient information to enable us to know the cause of its loathsome condition. The noxious gases, which render it nothing short of a gigantic gutter, principally arise either from fœcal sewage or from the refuse of chemical preparations. Above Hamilton, neither the Clyde nor its tributaries are apparently polluted; but the sewers, and natural

streams long since converted into sewers, which find their way into the river through forty-two outlets, are about one hundred miles in extent. Many of these affluents, notwithstanding that the best known means have been adopted to render waste outflows innocuous, emit a most offensive smell. And no wonder why. For what are they but ready receptacles of all liquid refuse from chemical works, dye and bleach works, gas works, calico and silk print works, paper works, tanyards, breweries, distilleries, and mines? Passing the Molendinar Burn, which was used by the ancient sovereigns of the city, the Archbishop and his clergy, in driving their corn mills, and St. Enoch's Burn, which, further westward, runs parallel to it, we come to the Kelvin—the chief tributary in the river basin. At one time this was, perhaps, the sweetest of all the Stirlingshire streams that sing their way to the sea. The Coel-avin—rapidly Celvin, *i.e.*, sacred root—has its rise near the centre of the parish of Kilsyth, flowing from the Campsie Hills (hills of the haunted glen), while its principal affluents are the Garrel, the Luggie, the Glassert, and the Allander. Formerly, the course of the Kelvin was open and serpentine; but, in 1792, its bed was considerably straightened, thereby giving the river a more rapid run, and preserving the adjacent lands from destructive inundations. Still, from the poisonous outflows of numerous works and manufactories which it receives, this beautiful stream has been transformed into the filthiest of common sewers. At the last analysis, the solid matter found in it was 225·0. The White Cart, the Black Cart, and the Grif, uniting, fall into the Clyde below Inchinnan Bridge.

Unhappily, every system of deodorisation or precipitation

that has yet been tried in connection with the preservation of our rivers from the pollution of sewage has resulted either in great commercial loss, or has failed to render the sewage innocuous; but while we may be prepared for a large and costly scheme—a modification, in fact, of the now all but forgotten proposal of Messrs Bateman and Bazalgette—Sir John Hawkshaw, by the provisions and recommendations of his late exhaustive report on the pollution of the Clyde, has undoubtedly brought matters to a practicable point. In the first place, it discusses various questions affecting the disposal of the sewage of Glasgow. It shows that in any plan for the purification of the Clyde a system of intercepting sewers is necessary, and it proposes that these sewers should be extended from the city to Whiteinch. It examines the various ways in which the sewage might be disposed of after it has been conveyed to this point, rejects in succession filtration, irrigation, and deodorisation processes, and points to the necessity for the construction of a great outfall sewer which would conduct the offensive matter to Farland Head, and then discharge it into the Firth of Clyde. The works necessary for carrying out this scheme would cost 25 millions; the annual charge would be £108,000, or $6\frac{1}{2}$ d per £ on the rateable value.

In April last, a large number of young salmon smolts were taken in baskets from the shallow water at Govan Ferry Slip. It is thought the shoal was on its way to the sea, and that the fish were sickened by the poisonous waters in the harbour. But it is just possible that we may yet have an abundant stock of healthy salmon in the Clyde a short distance from the city. The river at Dalmarnock was, not long ago, a celebrated station for the angler. Here, its

waters absolutely swarmed with par, and many a good basket of the same, not then known to be the fry of the salmon, have been taken by the Rutherglen weavers, as with double rods they swept the stream from bank to bank. The purification of the Clyde ! 'Tis a consummation devoutly to be wished.

PRIMEVAL NAVIGATION OF THE CLYDE.

WE do not know when the Clyde was first navigated, but it was certainly sailed upon and probably fished long before the Roman invasion, and before the building of the great wall between the rivers Forth and Clyde, intended to protect the territory of the masters of the world from invasion by the barbarians of the north. We do not even know with certainty who these barbarians were. Caledonians or Antochthenes are rather vague terms. They may or may not have been identical with the full-dress barbaric personages regarding whom a certain poet perpetrated the famous bull—

“A painted *vest* my *naked* sire had on.”

Whoever they were they seem to have understood the art of navigation better than the ancient Briton, who had no better appliance for crossing rivers and estuaries than wickerwork covered with hide. The Caledonian had his canoe dug or burned out of the trunk of a tree, and fashioned with seemliness into boat shape. In 1726, one of these vessels was discovered near the influx of the Carron into the Forth. It is the largest hitherto discovered, measuring 36 feet in length, $4\frac{1}{2}$ feet in beam, and 4 feet in depth. A boat

of this size, well manned by hardy aborigines, would be capable of facing rough weather along the coast. The next largest craft to this discovered in Scotland was recovered from the silt near Bowling, some years ago, by the late Mr Currie, manager of Littlemill Distillery; and with the larger boat was unearthed a smaller companion. The biggest boat consisted simply of the trunk of an oak, rough as it grew, and hollowed out, measuring in extreme length $23\frac{1}{2}$ feet, and in mean girth 11 feet. No attempt seems to have been made to fine away the canoe either towards stem or stern, so that it must have belonged to a very early and rude age indeed. The lesser was 13 feet in length, 3 feet beam, and 2 feet deep. It has been supposed that these rough specimens of boatbuilders' work were used at a ferry established here ages before the Roman era. The next largest canoe to that found at Bowling was discovered embedded in the mud and gravel of the Forth, near Cambuskenneth Abbey, in May, 1874. This was 20 feet long by 3 feet beam, and hewn out of a single piece of solid oak trunk. But the Vale of Clyde has produced more of these relics of the primitive race than any other quarter, considerably over a score having been found within the century, most of them in the neighbourhood of Glasgow. The reason of these canoes being found inland—in some cases under the streets of the city—is supposed on good grounds to be that in early ages the whole plain of Glasgow was an estuary or firth, the Clyde pouring its waters into it at a point not lower than Bothwell.

The first canoe discovery in the city of which we have any record took place in 1780, while the foundation of St. Enoch's Church was being dug. It lay in a horizontal position on its keel, at a depth of about 25 feet below the surface of what

was then called St. Enoch's Croft. A stone hatchet in good preservation was also found within it near the prow. The second canoe was discovered in 1781, while the foundation of the Tontine, at the Cross, was being excavated. The third was got about 1824, in Stockwell, near the mouth of Jackson Street. A fourth, which lay in a vertical position, with the prow uttermost, as if it had sunk in a storm, was brought to light in 1825 during the formation of a common sewer in London Street, near the site of the Old Trades' Land. A number of marine shells were found inside this canoe.

A fifth, 11 feet long by 27 inches in breadth, and of the depth of 15 inches, was discovered in 1847 on the lands of Springfield, south side of the Clyde. Within two years other four were got at that same place, the largest of which measured 19 feet 4 inches in length, by 3 feet 6 inches wide at the stern, and in the centre 2 feet 9½ inches; depth, 30 inches. The stern of this canoe was very perfect, and afforded a most satisfactory example of the manner in which these ancient vessels were closed in. It consisted of a thin board, placed vertically in a horizontal groove across the bottom, and fixed in vertical grooves down each side. This board was about 8 inches from the extremity of the boat, thus leaving a small piece of the sawn tree projecting behind. There were no rollocks, so that the canoe had probably been propelled by broad paddles. Happily, this relic of long-past ages, so remarkably perfect, has been preserved in the Hunterian Museum of the University.

Towards the close of 1851 a canoe was found on the north bank of the Clyde, near the mouth of the Kelvin, embedded in a seam of sand, close upon blue clay. Having been torn up from its ancient resting place by one of the steam dredgers,

it was unfortunately much damaged. Its length was 12 feet, breadth 2 feet, and depth 1 foot 10 inches at the most perfect portion. Early in 1852, another was unearthed in the course of improvements then going on at Clydehaugh. It lay 12 feet below the surface, in a bed of finely laminated sand, and about 25 feet back from the lip of the ancient channel of the stream. Like the others, it is formed out of an oak. It is 12 feet long, 2 feet 5 inches broad, and in depth 2 feet 6 inches. About midway between the bow and stern there is a small rest for the end of a transverse seat. This rest has just been left as a projection by the savage when scooping out the boat, and forms an integral part of the gunwale. The breadth of the seat has been $4\frac{1}{2}$ inches. This canoe differs from the others in the formation of the stern, which, in these, was shut in by a moveable board, placed in vertical grooves down the sides of the vessel, and fixed in a horizontal one across the bottom, to enable the canoemen to draw it out when ashore and run off the water shipped instead of canting her. But, in this Clydehaugh specimen, both ends of the tree have been left uncut; that is to say, the rude artificer has economised the tree, and dispensed with the moveable board by fashioning a permanent stern out of the root. The bow is not unlike that of the ordinary fisherman's cobble, and has a snout-like appearance without any cuts water, as in some of the other specimens.

In the same year, and within 50 yards of the same place, a second canoe, considerably smaller, and not nearly so well preserved, was discovered. Its length is 14 feet 10 inches, breadth 2 feet, and depth 14 inches. The oak of which it is fashioned has been about $4\frac{1}{2}$ feet in circumference. In general appearance it resembles the one previously unearthed, only the stern is here open, with the usual groove for receiv-

ing a vertical board. One remarkable circumstance connected with this canoe is that there was found, lying under the stern, a thin piece of lead, 8 inches long by 5 inches broad, and perforated with holes for pegs or nails. These holes are square. It would seem as if this plate had been fixed to the bottom of the boat, but for what purpose is not very obvious. Not long afterwards, three more canoes were dug out from Clydehaugh a few yards from where those above mentioned were found. They were lying in the same extensive bed of laminated sand, at a depth of about 15 vertical feet. One was much decayed and damaged, but the remaining two are in excellent preservation. When first seen, both were lying flat in the sand, as if they had sunk in smooth water, and been gradually silted up. The prow of the largest—probably a war-canoe of the tribe—was pointing to the north-west, in the general direction of the river; the smaller one, which is not unlike a punt to it, was a few feet astern, and lay as if she had been drifting down the stream, broadside on, when she sank. The biggest of these antique boats is rather imposing. She is not at all crank, but broad and substantial; measuring 14 feet in length, 4 feet 1 inch broad, and in depth 1 foot 11 inches. She is hollowed out of what has been a magnificent oak. This tree has been very cleanly divided at the thickest place. Sharp tools must have been employed, for the interior is very smoothly cut, and the whole boat remarkably well executed. The natives have rowed instead of merely paddling her. Two neat semicircular knobs, each resembling a large horse-shoe with the concave facing the bow, have been left uncut on the floor, at a convenient distance from the seat, for the rowers to rest their feet against. Towards the bow, a large circular aperture occurs in the

bottom which has been stopped by an oaken-plug as thick as a man's wrist and nearly a foot long. This plug was found sticking in the hole; and in order that it might not be lost, it is perforated by a circular eye to receive a thong for fastening it to the inside of the boat. It is not unlikely that this large aperture in the bottom was intended for the double purpose of running off the water shipped afloat, and of sinking the canoe when the savages wished to conceal her.

The smaller canoe is 10 feet long, 3 feet 2 inches broad, and 1 foot deep. It, also, is formed of a single oak; sharp at both ends, and well scooped out. There is no mark of seats. While in use, this little canoe had met with an accident, which drove a hole through one of her sides, near the bottom. One would have thought that, as both wood and labour in these days were cheap, the damaged boat would have been at once thrown aside, another tree felled in the forest, and a new canoe formed. But these barbarians were thrifty. They patched up the hole in the boat, and this they have managed very neatly. A piece of wood, about a foot square, has been fitted over the aperture, and fastened at each of the four corners by wooden pegs, making an excellent job, and by the aid of puddled clay rendering the canoe quite water-tight. The stern is sharp and closed, and the sides of this small vessel are perforated by a number of holes similar to those in the large one. The only other peculiarity about her is that at the bow there is a slanting, angular, indentation, over a foot long and about two inches broad, resting diagonally in the groove.

Other canoes have been found, but to describe them is unnecessary, since the various types have been already noticed, and the later discoveries offered nothing new. Into

the navigation of the Clyde, from the beginning of the historical period until the energy and foresight of the citizens led them to begin deepening the channel of the river, we shall not enter. The real usefulness of the river to the city began with the sailing of the *Comet*. But one question may be asked, Did these canoemen know the use of iron? This is doubtful. Not a particle of metal has been detected about any of the specimens except one, and it lay under her merely. On the contrary, the plugs, pegs, &c., are all of wood. One strong circumstance connecting them with what antiquaries call "The Stone Period," is the fact that a hatchet made of stone was found sticking in one of the canoes. It is of greenstone, beautifully polished, and has a keen edge, quite adequate for working in timber. The arrows, too, were tipped with flint or bone. One thing is certain, that some of the boats are much older than others; and that while these may be referred to "The Stone" epoch, others belong to a later, probably "The Bronze" period.

THE GLASGOW CUSTOMS HOUSE.

THE first notice we have of the existence of a Customs House in Glasgow is of no later date than 1639 ; but when we consider the condition of the Clyde navigation at this period, the circumstance cannot be considered very remarkable. The establishment was then situated at the foot of Stockwell Street, and the locality was entirely suitable for the purpose. If the officers ever complained of hard work they had little reason, for the total revenue arising from both imports and exports was, in 1656, according to Mr Thomas Tucker's report, only £554. During the troubles of 1745, the Hon. Andrew Cochrane, who was then Lord Provost of Glasgow, wrote :—" The Custom House is shut up, and the officers have absconded, though we have 4000 hogsheads of tobacco lying in the river undischarged." But what was tobacco, or a Glasgow Magistrate either, to a Customs House official in terror of receiving a " clammihewit " from the Lochaber axe of one of Prince Charlie's wild Highland followers ? Down to 1757, the Customs duties continued to be collected in the place where the officers were first stationed ; but in the interval between this year and 1764 a move seems to have been made, for in the latter year the business was transacted in a large room in a coffee-house in the same street. No doubt an increase in business gave occasion for the flitting. In

1791, another move was made; but this time a flight was taken westwards, the office being situated on the west side of Queen Street. Still another fitting took place half a dozen years afterwards, the place selected being a half-sunk apartment, 18 feet square, in a tenement situated at the north end of Virginia Street. Again six years, and the officials found rest for the soles of their feet on the ground floor of what is now the Athenæum in Ingram Street. But the lively revenue authorities were not long content here either. A dozen years afterwards—in 1815—they moved into St. Enoch's Square, where they remained until 1840, when they transferred themselves to the building presently occupied in Great Clyde Street, and erected expressly for their use. It may be noted that the ground on which the Customs House stands was bought for £3 per square yard, free of feu-duty or ground annual. At present it is worth at least ten times that rate per yard, so that for once the British Government has been a fortunate speculator. Another move, or failing that, an extension of the premises, must soon occur, for the accommodation offered to the public at this moment, notwithstanding some trifling improvements, is altogether inadequate to the wants of the city. Curiously enough, Glasgow has never been treated with liberality by the Government. So far as Customs duties were concerned, Port-Glasgow was the principal station on the Clyde from 1700 till 1812, Glasgow and Greenock being merely considered sub-ports under the control of the authorities of the former. In the latter year, however, both were declared independent, and success speedily justified the measure. Prior to 1817, the trade of the city was seriously hampered by a Customs regulation requiring duties to be paid immediately on the arrival of the goods. But in the

year in question this annoying restriction was removed, and the privilege conceded of securing merchandise in warehouse under bond. The effect was electrical. A revenue which in 1800 amounted to only £469, sprung up in 1820 to £11,428; in 1830, to £72,054; in 1840, to £472,564; in 1850, to £645,670; in 1860, to £883,972; and in 1868, when the culminating point was reached, to £1,352,246 12s 5d. Owing to the removal of some duties, and the lowering of others, the Customs revenue sunk in 1870 to £963,534 10s 7d; but it is again showing elasticity, and in 1872 the figures were £1,033,181 10s 6d. But this does not represent the entire amount of duties collected on the Clyde. Greenock returned, in 1872, £988,104 9s 7d, and Port-Glasgow £13,530; giving, with Glasgow, a total of £2,134,816 0s 1d, or a tenth of the entire Customs duties of the United Kingdom. The following is a comparative statement of the revenue at this port for the quarter which ended on the 30th June last, with the four preceding similar periods :—

1872	..... ..	£254,526	12	5
1873	..... ..	263,714	11	3
1874	..... ..	243,528	17	4
1875	..... ..	234,316	0	7
1876	..... ..	247,268	18	3

It was not until 1809 that vessels were permitted to be registered at Glasgow, and even then the privilege was confined to vessels trading direct from the port—a limitation which was not removed till 1824. As in the former case, the extension of additional facilities to the trading class was attended with most satisfactory results, as will be shown by the following figures :—

Year.	No. of Vessels.	Tons.
1809	10	703
1810	24	1,956
1820	77	6,131
1830	217	39,432
1840	403	85,707
1850	512	134,603
1860	660	212,028
1870	892	428,262

In 1828 Glasgow was constituted an East India port, and permission was given for produce coming thence to be warehoused. A similar concession was granted with regard to tobacco in 1832, and to tea in 1834. The first ship which arrived in the Clyde from India was the *Anna Robertson*, in January, 1817; and the first with a cargo of tea from China was the *Campden*, in October, 1834.

Probably as good a way as any of showing how fast the trade of Glasgow has risen, is to note the estimated value of the exports of British produce and manufactures sent from the port during a series of years :—

Year.	Value of Exports.
1839	£1,849,256
1840	2,214,320
1845	2,639,217
1850	3,768,646
1855	3,916,569
1860	5,499,000
1864	6,770,368

Unfortunately, our official statistics come no further down; but if we base a calculation of the exports on the figures already given, making due allowance for causes operating towards a reduction, we shall find that something over £10,000,000 is no more than a modest estimate of the present date. The citizens of Glasgow have come to deal pretty largely in tea, and the following figures showing the amount

on which duty has been paid on the Clyde at various periods may be accepted as voucher for the fact :—

Year.	Tea in lbs.
1855	3,441,272
1860	4,071,328
1865	5,504 351
1870	6,626,442
1872	6,765,590

A comparison between the quantities of tea on which duty has been paid in Glasgow and one or two of the leading Scotch ports ought to be interesting, and here it is :—

	1869. Lbs.	1870. Lbs.	1871. Lbs.	1872. Lbs.
Glasgow.....	6,313,754	6,626,242	6,937,326	6,765,590
Leith.....	2,872,856	2,788,425	2,850,168	2,939,038
Aberdeen.. ..	887,231	877,030	875,963	851,549
Dundee.....	615,911	647,966	672,200	716,750

To sweeten all this tea, the importations of sugar to the Clyde appear to be amply sufficient. A table is given beneath showing the quantity of raw sugar imports at five yearly periods, beginning with 1845 :—

Year.	Tons.
1845	17,044
1850	35,254
1855	45,928
1860	79,499
1865	138,455
1870	209,533
1875	241,334

An astonishing quantity of beet-root sugar is now imported, though twenty years ago the article was barely in use, for in 1858 the whole quantity imported was but 2500 tons. The appended table exhibits the extraordinary progress made by the trade :—

Year.	Tons.
1860	7,806
1865	17,700
1870	35,018
1872	52,871

Most of all this produce goes to Greenock, for Glasgow has only two refineries, while Greenock stands in the front rank both as a sugar importing port and as a sugar refining centre. The total number of vessels which arrived in the Clyde during last year (1875) was 1562, of which 487 were sugar laden.

If Glasgow gets through a fair quantity of tea and sugar, it must be confessed that she makes ample provision for the tobacco-smoking propensities of herself and neighbours. The subjoined figures show the quantities of tobacco on which duty has been paid on the Clyde in the years mentioned :—

Year.	Tobacco.
1855	1,594,818
1860	1,664,278
1865	2,017,998
1870	2,487,955
1872	2,692,456

These statistics exhibit a fair trade in “the weed” as remaining to Glasgow still; but they will not serve to place her in the position as to this article which she occupied in 1775, when out of 90,000 hogsheads imported into Great Britain she alone absorbed 57,143. A vast amount of smuggling went on in these flourishing days of the trade. In 1764, for example, the Customs House officers burnt at the Broomielaw, in a Glasgow “Queen’s Tobacco Pipe,” 4605 lbs. of sound leaf, and 445 lbs. of snuff. A little smuggling goes on still, but an attempt to evade the duty is now seldom made for sordid purposes. Sailors are fond of having a bit of “genuine foreign” to bestow on their friends when they go

ashore. They have also a decided aversion to having anything to do with the searchers connected with the Customs House, and the dodges to which they resort to conceal their little hoards from the prying eyes of those officials are sometimes very amusing. Tobacco was concealed in all sorts of out-of-the-way corners—and these abound on shipboard—and often it was so openly placed, and so fairly exposed to the eye of the official, that the very simplicity of its concealment proved its protection. A favourite place with the tars used to be to unlash the fastenings of the birch brooms kept for scrubbing the decks. The handle being thus released from the birch branches, the latter were carefully intermixed with tobacco leaves, the broom was relashed and left carelessly lying about the deck under the very noses of the prying searchers. The “galley,” having many nooks and corners, was another highly esteemed hiding hole; and the “doctor” himself has been known to do a very tidy bit of smuggling by putting the tobacco in his coppers. Large pumpkins, often brought from the West, have been neatly sliced open, and the interior carefully stowed with tobacco. Tightly packed in tarred canvas, it has been lashed to the cable and sent down with the anchor. Cork fenders have been elaborately discharged of their burden of cork, and packed with the precious leaf. In short, no place below or aloft offering any chance of concealment has escaped the critical eye of Jack bent on escaping duty. On one occasion, about a score of years ago, a sharp-eyed official detected that the bunt of the fore-topsail of a vessel lying in the harbour had rather an unusual bulge. He formed instantly a shrewd guess at the cause, and ordered the sail to be let fall. The order was obeyed with some reluctance, and when the gaskets were cast off there came tumbling down on deck, much

to the officer's satisfaction, a hundredweight or two of prime Virginian.

From 1785 to 1818, when times were troublous and the authorities apprehensive of disturbances, a military guard, consisting of a corporal and three privates, was maintained on duty at the Customs House; but since 1818 the care of the Government property has been left to Dogberry and Verges of the City Watch. The present Customs House building is chiefly remarkable for the dirt of its interior, and for its utter unfitness in point of size to permit the immense business which has now sprung up to be conveniently transacted. An addition, it is true, is in progress; but the addition is a delusion and a snare. What is wanted is a new building on a scale sufficiently large to give plenty of room for growth. Dublin has a magnificent Customs House, and no customs; Glasgow has a shabby Customs House, through which over a million sterling is contributed to the revenue. Could not the Government do "Justice to Ireland" and "Justice to Scotland" at a stroke by hiring an intelligent American, accustomed to transporting houses from their sites, to change the Customs Houses on the Clyde and on the Liffey? The splendid edifice which is useless in Dublin would exactly suit Glasgow, and that which stands in the latter city is certainly big enough to supply the wants of the Irish capital.

STEAMER TRAFFIC ON THE CLYDE.

STEAMBOAT traffic on the Clyde begins, as everybody knows, with the starting of the *Comet* by Henry Bell to run between Glasgow and Greenock. The story is as hackneyed as any story could well be, for it is served up annually, and sometimes oftener, by the daily press when noticing any feat in shipbuilding. Henry Bell was originally a mason, then a wright, but latterly the keeper of baths established at Helensburgh. He seems to have been a shrewd far-seeing man, a little in advance of his age, as most capable men are. He had no eye for the "impossibilities" seen by others in any novel enterprise, and it is to this incapacity of vision that we owe the starting of the *Comet*, and all that the starting in question has done subsequently. One of Bell's intimate friends was John Robertson, an engineer, who was also a "man of ideas." As far back as 1807, Bell and he had frequent conversations regarding the possibility of propelling a vessel by steam; but some years passed away before the project was matured, and difficulties arose which prevented the plan from being carried out as soon as it would otherwise have been. At length, in 1811, Mr Bell employed Mr John Wood, shipbuilder, Port-Glasgow, to construct a small vessel; and Mr Robertson, who was then in business for himself in Dempster Street, Glasgow, having made an engine of three

horse power, sold it to his companion, and undertook to fit it into the boat with boiler and all necessary appliances. The price of the engine is given as £165, and of the boiler £27, and the date of the sale April, 1812. Shortly afterwards, Mr Robertson took the engine down to Mr Wood's yard in a lighter, and found the vessel ready for launching. She was a neat, well-shaped little craft, measuring 40 feet keel and 12 feet beam. She was gaily painted, and had the figurehead of a lady. Her cabin, which was very small, entered from the stern, down a few steps on each side. She had a mast, bowsprit, lug-sail, and four paddle wheels. She was navigated by four adventurous men, viz., a master, an engineer, a pilot, and fireman. The name of her first captain was William M'Kenzie, who had been a schoolmaster in Helensburgh; the engineer was Robert Robertson; the pilot was a Highlandman, named Duncan M'Innes; but the fireman's name is lost to posterity.

The *Comet's* first voyage, under the care of these functionaries, was from Greenock to Glasgow, on Thursday, 6th August, 1812, when she arrived at the Broomielaw in three hours and a half. It was found, however, as Robertson had predicted, that the four paddle wheels were unsuitable. She would not steer. Consequently two were taken off, after which she went to better purpose. The fares were 4s first cabin, and 3s second cabin.

After a short time, Bell resolved to enlarge the *Comet*. She was accordingly lengthened 20 feet. This operation took place on the beach at Helensburgh. The original engine was also displaced by one of six horse power, made at Cartdsyke, Greenock, by Thomas Hardie.

So great became the success of the *Comet* that, in 1819, we find her orbit widely extended. On September 2nd of

that year, she is appointed to sail from Glasgow to Greenock, Gourock, Rothesay, Tarbert, Loch Gilp, Crinan, Easdale, Oban, Port-Appin, and Fort-William, and on this station she continued to run, awaking, no doubt, profound astonishment in the Celt of the period, until October, 1820, when she was wrecked in the Dornist Mhor in an attempt to round the point of Craignish. Her weak engine power was ill-fitted to contend with the rapid tidal currents which sweep and eddy with amazing force through the "Big Door." The mishap would be accepted as a special interference of Divine Providence by the "unco guid" of those days, many of whom had been prognosticating evil, and declaring it impious in Bell to attempt, as they said, to fight against nature and God; or, to put the matter in the plain English used in our time, to drive a vessel against wind and tide. To keep up the name of the pioneer of steam navigation, a new *Comet* was built by subscription in 1821 for the same route. After running safely for some years, *Comet* the second came into collision with an Ayr steamer off Gourock on the 21st October, 1825, and went down with the loss, unhappily, of no fewer than 70 lives.

We have now disposed of the *Comets*, and may return to the successors of the first. Enterprising shipbuilders were not long in seeing that a new vocation had been opened up for the exercise of their energies. In November of 1812, Messrs John Wood & Co. launched the *Elizabeth*, of 40 tons, her engine of 10 horse power being supplied by Messrs John Thomson & Co., Tradeston. This was the first boat to ply regularly to Helensburgh, but she was on the station only two years when she went to Liverpool. In 1813, the third steamer launched on the Clyde was turned out of Messrs

Wood's yard. She was still larger, measuring 49 tons, but having the same power as the *Elizabeth*, and by her the first steamer trip to Gourock was made. Immediately afterwards, the *Glasgow*, 52 tons, 14 horse-power, was launched from the same yard, and extended the range of sailing to Largs. The *Glasgow* was the finest and largest steamer then afloat, and was long regarded as a model vessel. In 1814, quite an accession took place to the steam-shipping list, the *Trusty*, *Princess Charlotte*, *Industry*, *Prince of Orange*, the first *Argyle*, and the *Margery* appearing on the river. The *Princess Charlotte*, built by James Munn of Greenock, was the first vessel supplied with two engines. Her machinery came from the workshop of Boulton & Watt, Soho, who were the first to use the double condensing engine connected by cranks set at right angles to each other on the shaft. Another experiment was made by James Cook, Tradeston, in the case of the *Argyle* which was fitted with a side-lever engine of 14 horse-power. This vessel ran for a short time only on the Clyde, having gone to Dublin in 1815, from which place it was despatched round the Land's End to London in the May of that year, to ply between the Metropolis and Margate. It is not so long since the *Industry* of 10 horse-power, built at Fairlie, launched in May 1814, and engined by George Dobbie, Tradeston, ceased plying. She was not laid aside, however, until she attained the distinction of being the oldest steamer in the world. The *Industry* was constructed as a luggage boat, to run between Greenock and Glasgow, in company with the *Trusty*, built of similar size by Archibald M'Lauchlan, Dumbarton, and engined by Mr Dobbie. The *Trusty* was launched in February, 1814, and both boats were owned by Mr Cochrane, at one time a tanner near the Spoutmouth, Glasgow. In

1815, the *Britannia*, *Dumbarton Castle*, *Caledonia*, *Greenock*, and the second *Argyle* were added to the fleet. The *Britannia* measured 73 tons, and had two engines of 14 horse-power each. Her career began on the river, but her trips were ultimately extended to Londonderry. The *Caledonia* was still larger and more powerful. She was built by Messrs Wood and supplied by the Greenhead Foundry Co. with two engines of 18 horse-power each. In 1816, the *Waterloo*, *Neptune*, *Lord Nelson*, *Albion*, and *Rothsay Castle* came out. The latter built by Archibald M'Lauchlan, Dumbarton, and engined by Duncan M'Arthur & Co., Camlachie, was of 34 horse-power, and plied at first to Rothsay, extending her runs afterwards to Ardrishaig and Inverary. By 1818, there were seventeen steamers running regularly between Glasgow, Greenock, Largs, Rothsay, Inverary, Campbelton, and Ayr—a rapid advance from the solitary little *Comet* of 1812. Their speed against wind and tide averaged about 8 miles an hour ; with both in their favour they frequently attained a rate of 12 miles. In this year, the *Rob Roy*, 56 tons and 30 horse-power, engined and owned by Mr David Napier, was placed on the Belfast station, and was the first regular sea-going steamer in Europe. The *Robert Bruce*, 90 tons and 30 horse-power, came out in 1819, and was the first vessel which plied regularly between the Clyde and Liverpool. In the same year, the *Sampson* of 53 tons, and having 2 engines of 20 horse-power each, was launched. This vessel was designed for and employed in towing vessels up and down the river, and was the first steam-tug in Europe. Passing over a few years, we find that in 1828 the number of steamers sailing from the Clyde had increased from the 17 plying in 1818 to 59. They had also increased in size, the average burden in

1828 being 140 tons against 85 tons in 1818. We give a tabular statement for 1828 :—

STATIONS.	Tugs.	Goods.	Goods and Passengers.		Passengers.
Clyde	4	...	6	...	—
Dumbarton.....	—	...	—	...	2
Helensburgh	—	...	—	...	6
Gourock.....	—	...	—	...	2
Lochgoilhead.....	—	...	—	...	5
Largs and Ayr ...	—	..	—	...	2
Rothsay	—	...	—	...	3
Lochgilphead.....	—	...	—	...	1
Ayr.....	—	...	—	...	1
Stranraer	—	...	—	...	1
Inveraray	—	...	—	...	4
Fort-William	—	...	—	...	1
Inverness	—	...	—	...	4
Campbeltown.....	—	...	—	...	3
Londonderry	—	...	—	...	3
Belfast	—	...	—	...	3
Dublin.....	—	...	—	...	1
Liverpool	—	...	—	...	4
Totals	4	...	6	...	21
					28

From this Table it will be seen that steamer traffic on the Clyde had, in the course of 16 years from its commencement, attained a considerable degree of development. Many of the ports of call, however, with which we are now familiar were not then in use—some of them, indeed, had no existence—the greater number of the coast villages being, so to speak, but the creations of yesterday. Kilmun, though a pleasant little place, had no steam communication. Houses along the Dunoon shore were few and far between. The Gareloch, now dotted with piers, was unbroken by the paddle; and so was Loch Long. Millport was untouched, and Arran was unvisited. But as time went on facility of access to the coast, coupled with the growing wealth of Glasgow, caused villas to spring up rapidly at the sea side. Hamlets became

villages, and villages little towns. By mutual reaction, the steamers made "The Coast," and "The Coast" made the steamers; while Glasgow fostered both.

The 24th July, 1835, was signalised by the first explosion in connection with the steam traffic, when the boiler of the *Earl Grey* exploded with terrific force when lying at Greenock Pier on her return trip from Dunoon to Glasgow. The explosion was so terrific that the deck of the vessel was blown completely off from the funnel to within eight or nine feet from the stern. Some passengers who had been in that part of the ship were blown on to the pier and into the sea, and in all six persons were killed and fifteen severely injured. The only other explosion of any consequence which has occurred on the river took place a few years afterwards in the high-pressure steamer *Telegraph* at Helensburgh Quay, and this, too, was attended with destructive and fatal consequences. This vessel was started to compete with the railway, and it was thought that by making her engines high-pressure a high rate of speed would be obtained; but the locomotive, of course, had an easy triumph.

In 1836, the *Fairie Queen* was started on the Largs line. She was built at the Black Quarry by Nelson. Being the first iron passenger steamboat ever launched, immense crowds of people gathered to see an iron ship that could float. In 1838, the *Victor* was started on the same line, and was succeeded by the *Warrior*, the *Invincible*, and the *Mars*, the latter of which was wrecked in 1846 immediately south of the Largs Quay. We quote from an interesting paper which appeared a few years ago a few passages descriptive of the Largs and Rothesay traffic at this period. "In 1840, an immense impetus was given to the traffic by the opening of the Greenock Railway, when the fares to Rothesay were

reduced to 6d. The railway company lost no time in starting a line on the Helensburgh route, comprising the *Rothsay*, the *Pilot*, the *Pioneer*, and the *Petrel*. The *Countess of Eglinton* followed these, but was totally lost on the south end of the Allans, opposite Millport Quay, in 1845. The same company also chartered the *Isle of Bute* and the *Maid of Bute*. It was about this time that Young built the *Lady Brisbane*, to compete with the *Largs*. Both this ship (launched in 1843) and the *Lady Kelburne* (1844) were owned by a number of Largs gentlemen, including Messrs Caldwell, Blair, Glen, and others, the shares being small and distributed over a large number, in the attempt to secure a monopoly of the custom. The further to stimulate the popular sympathy, boys were bribed to hurrah for the *Lady Brisbane* and the *Lady Kelburne* on their arrival at Largs Pier. At one time, when the competition between the *Victor* and the *Lady Brisbane* was peculiarly hot, the former lowered its fares from Glasgow to Largs and Millport to 3d."

About 1843, Kilmun was called into existence by Mr David Napier, who had laid the foundation of its prosperity some five or six years before, when he built the range of cottages called "The Row." The first boat to run to Kilmun was one of that name, which was followed two years later by the *Luna*, built by Mr William Napier at the Swallow Foundry, Glasgow. Dunoon likewise became a port of call; Arrochar was added to the list, and the Lochfyne and West Highland trade generally had become greatly extended. Sligo was added to the deep sea ports traded with, and steamers had begun to ply regularly from Ardrossan to Fleetwood and to Belfast in connection with the railway. But the state of the traffic will best be shown by the follow-

ing table of the number of steamers running from the Clyde in 1845 :—

STATIONS.	Vessels.	Goods and Tug-Boats.		Tons.
Liverpool	5	...	—	2287
Dublin and Cork	4	...	—	1135
Belfast	3	...	—	664
Londonderry and Sligo	3	...	—	630
Campbeltown	2	...	—	233
Stranraer	2	...	—	287
Dunoon, Tarbert, Lochgilphead, Inveraray, and Islay	6	...	—	635
Kilmun	3	...	—	169
Largs and Millport	3	...	—	252
Helensburgh	4	...	—	271
Lochgoilhead	1	...	—	81
Dumbarton and Greenock	2	...	—	118
Arrochar	1	...	—	69
Lochgilphead, Islay, Oban, Tobermory, Portree, Fort- William, Inverness, Staffa, and Iona	7	...	—	595
Greenock	—	...	14	839
Totals	46	..	14	8315

The following vessels also plied from outports of Glasgow :—Greenock to Rothesay (Railway Steamers)—*Pioneer*, *Pilot*, and *Maid of Bute*; Greenock to Helensburgh—*Isle of Bute*, and *Royal Victoria*; Ardrossan to Fleetwood—*Her Majesty*, and *Royal Consort*; Ardrossan to Belfast—*Glow-worm*, and *Firefly* (building); Ardrossan to Londonderry—*Isabella Napier*, and one building; Ayr to Stranraer—*Lady Brisbane*.

A comparison of this table with the last shows the changes which might be expected to arise from a fast growing port and a rapidly developing traffic. The vessels exhibit an increase in size and power, and the number of stations is enlarged. The *Admiral* in the Liverpool trade, and belonging to Messrs Thomson and M'Connell, was the largest

vessel sailing from the river, and would even now be considered a very fine and able sea-going steamer. There is nothing on the Clyde at present to give an idea of the massive appearance of the stout old ship, unless it be the *Shamrock*, sailing to Londonderry. The rig fashionable in those days for the larger class of steamers was a square rigged foremast, and fore and aft rigged main and mizzen masts. In these times, it is the exception to find either channel or river steamers carrying a square topsail. A bowsprit is becoming a rarity, and a jibboom is never thought of. We content ourselves with the more utilitarian billet head. The *Princess Royal*, also in the Liverpool trade, was of a more modern type than the *Admiral* and the others. She was built of iron instead of wood, and had a considerable advantage in speed, making her runs, under favourable circumstances as to weather, in some 15 hours, while her competitors took from 19 to 21 hours, and sometimes more. At that time, the Liverpool steamers were the crack sea-going vessels sailing from the river, their only competitor in this respect being perhaps the *Vanguard* in the Dublin trade. The once famous "Castle Co." had now arisen, and enjoyed a large measure of the river and Lochfyne traffic. Messrs Thomson and M'Connell had originated the swift passage to Oban, Staffa, and Iona, and the North Highlands, *via* the Crinan Canal; and their *Shandon* was the *Iona* of her day both in speed and appearance, the *Dolphin*, also a fine vessel, taking the route from Crinan northwards.

In the 30 years which bring us from 1845 up to the present time, the changes have been still more marked. Many good ships have come and gone; some coming to a bad end, such as the beautiful steamer *Orion*, which struck a sunken

rock off the Galloway coast on a fine summer morning, and went down with a terribly fatal loss of life. River steamers appeared in swarms, and continued to swarm until the demand for light-heeled craft to run the blockade established during the war between North and South in America thinned their numbers so much that we have now actually fewer vessels of this class than we had some 15 years ago. Messrs G. & J. Burns took a prominent position in the Liverpool trade, and all but absorbed that to Belfast, placing on both stations, especially on the latter, craft such as could not be rivalled elsewhere. Messrs David Hutcheson & Co. got possession of nearly all the Highland trade, and astonished the Clyde and the country generally with *Ionas*. Regular trade between the river and America was opened up, and by and bye came the now famous "Anchor Line," owned by the Messrs Henderson; but the first vessel which plied between Glasgow and New York was the *City of Glasgow s.s.*, 1609 tons, built of iron in 1859. This vessel is one of the "Lost Atlantic Steamers." She was sold after a few trips, and went on the Liverpool and Philadelphia station. Sailing on her second voyage, she was never heard of more. Lines to France, the Peninsula, the Mediterranean, and the East Indies sprung up and succeeded, and are succeeding. In 1876, the steam traffic of the Clyde has extended to a limit surpassing all previous expectation. Beneath is a table which may in some respects be imperfect, changes being so frequent, but which will be found sufficiently complete to serve its purpose :—

STATIONS.	Screws, Paddles.		Remarks.
Calcutta, &c. (City Line).....	10	—	...
Bombay, (Anchor Line).....	—	—	... { Screws, various.
Rangoon,.....	5	—	...
United States Ports, (Allan Line, Anchor Line, and States Line)....	—	—	... do.
British American Colonies, (Anchor Line, and Allan Line).....	—	—	... do.
Bordeaux, Havre, &c.,.....	6	—	...
Oporto,.....	4	—	...
Spain, Portugal, Mediterranean,.....	7	—	...
Antwerp,.....	4	—	...
Plymouth and Southampton,.....	1	—	...
Cork and Waterford,	9	—	...
Cardiff and Bristol,.....	5	—	...
Liverpool,.....	6	—	...
Dublin,.....	1	5	...
Isle of Man,.....	—	1	...
Barrow-on-Furness,	4	—	...
Belfast and Londonderry,.....	3	4	...
Ardrossan to Belfast,.....	—	4	...
Londonderry, Portrush, Sligo, &c.,	6	2	...
Galway and Limerick,.....	1	—	...
Islay,.....	—	1	...
West and North Highlands,.....	4	—	...
Oban, Fortwilliam, Inverness, &c.,...	1	7	... Royal Route
Loch Fyne,	1	—	...
Campbeltown,	1	1	...
Stranraer,	—	1	...
Ayr and Girvan,	1	—	...
Ardrossan and Ayr, ..	—	2	...
Arran,	—	2	...
Largs and Millport,	—	3	...
Rothsay and Kyles of Bute,.....	—	3	...
Rothsay,	—	7	...
Dunoon and Gareloch,..	—	2	... { Rail to Helensbro.
Kilmun, &c.,.....	—	2	...
Lochgoilhead,	—	2	...
Helensburgh and Gareloch, ..	—	4	...
Totals,.....	80	53	... Screws for Rangoon, U.S. Ports and B.A. Colonies, various.

Nothing need be added to this list to show how fast and how far steam traffic has been developed on the Clyde. There are still, to be sure, some important parts of the world to which regular lines have not yet been established, but the fore-runners of stated traffic have already appeared in the shape of occasional ships. By and bye, no country worth trading to will be left without regular packets from the Clyde.

CLYDE SHIPBUILDING.

THE justly acquired pre-eminence of the Clyde both in shipbuilding and marine engineering has given an extraordinary development to the trades connected with these important industries. Shipbuilding has, in fact, from very small beginnings, come to be the foremost of our manifold trades, and the Clyde now occupies in this respect the first position in Great Britain, and consequently in the world ; while it is gratifying to find that, notwithstanding the vastness of the trade, the workmanship is so superior that "Clyde-built" has everywhere become a warrant for excellence. Vessels of all sizes and classes are turned out from the river yards. Iron-clad frigates such as the *Black Prince*, heavily plated rams such as the *Hotspur*, troop-ships such as the *Malabar*, have left the Clyde to take an honourable position in rivalry with the productions of the Government dockyards. When tea clippers were racing home from China in order to be first with the season's produce, the smart ships built on the Clyde took the highest rank. These dashing vessels, to the intense disgust of "old salts," will never more be seen. The Suez Canal and the screw propeller sealed their doom. Indeed, the days of sailing vessels appear to be numbered. They are everywhere being pressed out of existence by the power of the remorseless screw. A

glance at the harbour any day is sufficient to demonstrate the fact. Once upon a time, funnels were to be seen only on the north side of the river. They are now almost as numerous on the south side, formerly the exclusive berth of sailing vessels. A few ships "of the long voyage"—Australia, New Zealand, or the Pacific coast of South America, together with traders to the West Indies, still remain; but the decadence is manifest. The regular New York traders are of the past, and even the famous line of Liverpool schooners is giving way and being gradually replaced by steamers. Before many years are over, a sailing ship will become a rarity. Though famed enough for building handsome, and stout as handsome, sailing ships, it is for building iron steamers that the Clyde has won its chief renown, and all within a space of little more than half a century. It was in 1812, on a January morning, that the *Comet* paddled out of Port-Glasgow harbour, the precursor of the enormous steam shipping trade of the entire globe. What a difference between the panting little vessel started by Henry Bell, and the *Iona*, most celebrated of river steamers; or, to put the matter still more forcibly, the *Scotia*, the largest and finest ocean paddle steamer afloat! We shall, in all probability, never see so large a paddle steamship as the *Scotia* placed afloat again. The screw is pushing the paddle out of the way as regards ocean steaming. Vessels propelled on the former principle consume less coal, have more cargo and passenger space at their disposal, and are consequently run at a greater profit to their owners. It is not for our own trade alone that ships are built on the Clyde. Foreigners are excellent customers, and give its shipbuilders and engineers large and remunerative orders. Iron-clads for foreign navies are frequently constructed in the local yards, and the

ocean-going steamers sent abroad are very numerous. In short, if Glasgow has at present any particular trade more entitled to the epithet "staple" than another, it is the construction of steamships.

Prior to the application of steam to navigation there was, no doubt, shipbuilding on the Clyde; but it was limited, for the most part, to the lower reaches of the river, the depth of water at Glasgow, and for many miles down, forbidding much progress in this direction in the neighbourhood of the city. The Thames, the Tyne, the Mersey, and the Humber were all superior in shipbuilding to the northern river, though the pre-eminence now attained by the latter is beyond all dispute. Even after the introduction of steam navigation there was a pause while the novelty was on its trial. Up till 1830, not more than five thousand tons of steam shipping had been launched. But after that date the trade sprang up with unchecked rapidity, until it attained its present extraordinary extent. The spirit of competition arose, and under its influence not only an improvement in form but an increase in size and power took place. It is to the late Mr Robert Napier of Shandon that the principal share of the credit of giving the Clyde its prominence in building steam ships must be ascribed, and with him must be associated the Woods of Port-Glasgow and Messrs Tod & McGregor. The first notable order received by Mr Napier was from the East India Company, who were induced by his rising reputation and the performances of his vessels and engines to entrust him with the construction of two large ships intended for packets, but fitted to serve on occasion as men of war. These were the *Berenice*, of 220 horse power, built in 1836, and subsequently the *Zenobia*, of 280 horse power. The *British Queen*, built by Mr John Wood of Port-Glasgow, followed, and was

in her day the largest steamer afloat. Her engines were of 420 horse power, which was then considered an extraordinary size. The next great undertaking engaged in by Mr Napier was supplying the first four vessels of the Cunard line. These, the *Britannia*, *Acadia*, *Caledonia*, and *Columbia*, measured each about 1200 tons, were built respectively by Messrs Robert Duncan, John Wood, Charles Wood, and Steele, and were supplied by Mr Napier with engines of 400 horse power. Then came, for the same concern, the *Hibernia*, *Cambria*, *America*, *Niagara*, *Europa*, *Canada*, and *Arabia*. The *Persia*, 3000 tons, 850 horse power, followed; and the *Scotia*, 4000 tons and 1000 horse power. These were all propelled by paddles, but they have disappeared from the service with the exception of the *Scotia*, which is still running. Mr Napier also built the *China*, the first "big screw" employed by this line in Transatlantic service. Success in this department gradually led to Government work. His earliest job for the navy was supplying engines for the *Vesuvius* and *Stromboli*, paddle sloops; then for the *Dauntless*, a screw frigate of 28 guns; and shortly afterwards he performed a similar service for the *Simoom*, a troop ship. The first experience of the Napier firm in the construction of iron-clads was gained in building the *Erebus*, a floating battery intended for service during the Crimean war, and in furnishing engines for the *Terror*. In 1859, they contracted for the *Black Prince*, 6040 tons, 800 horse power, the armoured steam frigate which was stationed so long as guardship at the Tail of the Bank. In September, 1862, the *Hector*, a powerful iron-plated vessel on the same principle, was launched; and in 1863 the *Rolf Krake*, a turret ship for the Danish Government. This latter achieved some renown during the Dano-German war, and was the first turret-ship

ever engaged in actual hostilities. The *Audacious* and *Invincible*, sister ships of 3775 tons and 800 horse power, were their next commissions from our own Government. The *Malabar*, a magnificent troop-ship of 4174 tons and 800 horse power, specially designed for conveying regiments to India, came afterwards ; and then the powerful ram *Hotspur*, which was launched in 1870.

We have given special prominence to the firm of Messrs Robert Napier & Sons, but it is no more than their due from the position they took in the trade at an early period and held so long unchallenged. Other establishments have since arisen, such as those of Messrs J. & G. Thomson at Dalmuir, and Messrs John Elder & Co., below Govan, which are second to none in these days in point of repute ; but no name is so closely associated with the rise and progress of steam ship building on the Clyde as that of Robert Napier. It was not, however, until the introduction of iron as the material for ships that the Clyde arrived at its fame. Natural circumstances then came to favour the river and the trade. The rich mineral district around supplied both iron and coal in abundance, and railways and canals made transport easy and cheap.

The first steamer built of iron was the *Aglaia* of 30 tons, which was launched in 1827, and plied on Loch Eck to facilitate the journey to Inverary. As stated previously, the first iron steamer to run on the Clyde was the *Fairy Queen* built in 1831. This vessel was conveyed from the yard at Old Basin (Hamilton Hill) to the river, a distance of a mile and a half, and launched at the Broomielaw. In 1838, Messrs Tod & Macgregor built two iron steamers, the *Royal Sovereign* and *Royal George*, for the trade between Glasgow and Liverpool. These were the first vessels of any

size so constructed, and it was predicted by many seafaring men that they must prove failures; but the predictions were not realised as the steamers were found to possess all the good qualities of wooden ships besides advantages peculiar to themselves. Prejudice once removed, the new material grew rapidly in favour and soon pushed wood aside. In 1840, the first seagoing sailing vessel built of iron on the Clyde was launched. This was the *Iron Duke* of 393 tons. She was ship-rigged, and sailed from Glasgow to India. The first iron steamer wrought with a screw propeller built and fitted up at Glasgow was the *Fire Queen* launched in 1845. She was 135 tons and was fitted with double engines of 80 horse-power collectively. The following table from an essay by Dr. Strang serves to show not only how fast ship-building advanced, but how rapidly wood was displaced by iron as regards steamers.

NUMBER OF STEAM VESSELS AND POWER OF MARINE ENGINES.

BUILT OR MADE AT ALL THE PORTS OF THE CLYDE FROM
1846 TO 1852.

Year.	No. of Vessels.	Wood No.	Iron No.	Paddle No.	Screw No.	Wood Tonnage.	Iron Tonnage.	Engines H.P. Wood Hull.	Engines H.P. Iron Hull.	Engines H.P. for Vessels not Built on Clyde.
1846 ...	17	—	17	14	3	—	7,125	—	2,490	300
1847 ...	26	3	23	21	5	5,485	11,514	—	3,770	410
1848 ...	34	2	32	23	11	2,117	10,292	2810	2,721	934
1849 ...	23	1	22	17	6	285	11,513	—	2,906	380
1850 ...	32	3	29	14	18	4,813	13,791	1725	3,482	620
1851 ...	42	1	41	22	20	2,402	25,322	—	6,169	940
1852 ...	73	4	69	30	43	3,229	49,716	2204	10,055	5850

Totals, 247 14 233 141 106 18,331 129,273 6739 31,593 9434

During the twenty years which followed, the trade grew and multiplied exceedingly; the reputation of the Clyde building yards rising, as it still continues to rise, day by day, and extending over the entire globe. Here are the results:—

NEW VESSELS LAUNCHED ON THE CLYDE DURING THE YEAR 1872.

	No.	Tons.	No.	Tons.
Iron Steamers under 100 tons each,	15	849		
Do. from 100 to 500 tons,	35	8,848		
Do. from 500 to 1000 tons,	29	19,841		
Do. from 1000 to 2000 tons,	59	80,668		
Do. from 2000 to 3000 tons,	25	61,465		
Do. from 3000 upwards,.....	12	43,449		
	—	—	175	215,120
Iron Sailing Ships under 500 tons each,	1	300		
Do. from 500 to 1000 do.,	8	5,488		
Do. from 1000 to 2000 do.,	4	5,089		
	—	—	13	10,877
Composite Steamer (iron frame—rest wood),.....			1	264
Do. Sailing Ship,.....			1	296
Iron Dredgers,.....			2	1,200
Iron Hopper Barges,.....			2	1,000
Wooden Steamers,.....			3	1,500
Wooden Smack,.....			1	90
Total,.....			198	230,347

Clear evidence is here of how completely wood has given way to iron. Even the composite method of construction, which once seemed about to succeed, has become all but extinct. And some very large vessels have been launched since 1872. In particular may be specified the *Thomasina M'Lellan*, 1873 tons, built by Messrs M'Millan & Co., Dumbarton, and the largest sailing ship afloat; the *Iberia*, s.s., 4820 tons, 750 H.P., from Messrs Elder's yard, and intended for the Liverpool and Valparaiso trade; the *City of Berlin*, still larger—5200 tons, 900 H.P.—for the Inman line, by Messrs Caird & Co.; the *City of Chester*,

about the same size, or a little larger; the *Bothnia*, for the Cunard line, by Messrs J. & G. Thomson, about 5000 tons; and the *Bolivia*, for the Anchor Line, not far if anything short of the same. Throughout 1874, in spite of some adverse circumstances, no decline in prosperity could be perceived. There was an increase of 31 vessels and 5700 tons then built, compared with 1873, when a larger amount of work was turned out than in any previous year. The increase in tonnage in 1874 over 1872 was 42,800; over 1871, 70,800; and over 1870, 77,000 tons. Six war vessels were built during the year, while in the two preceding no ships of this class were launched on the Clyde; there was a falling off to the extent of 8000 tons in paddle steamers, and of 30,000 tons in screw steamers built, compared with 1873; while there were 53 iron sailing ships of 65,500 tons launched, as against 12, of 19,000 tons in the previous year, and 11, of 12,500 tons in 1872. This is the largest number and tonnage of sailing ships built on the Clyde since 1869. The number of vessels of all classes launched during the year was 225, of 266,800 tons. Sailing vessels are dying out. The number built on the Clyde—

In 1868	was	108	of	79,346	tons.
1869		113		90,030	„
1870		83		42,595	„
1871		40		15,870	„
1872		38		15,100	„

It is unquestionable that the increase in 1873 noted above was but a spurt occasioned by the high price of coals, and the greater expense in running steamers consequently incurred.

During last year the following vessels were launched from the Clyde yards:—

Iron Screw Steamers,	102	Vessels of	107,336	tons.
„ Paddle „	17	„	13,273	„
„ Sailing Ships,	88	„	94,173	„
Composite Steamers,	5	„	1,480	„
Dredging Plant,	15	„	5,592	„
Total,	227		221,854	

Unfortunately, the returns for the first half of 1876 of this—the most prominent—industry of the Clyde show a considerable falling off, not only in the aggregate tonnage, but in the number of vessels launched, compared with the same period of 1875. The general complaint is that the amount of work on hand is gradually being reduced, and that new orders are scarce. Contrasted with the first six months of the two previous years, there is an increase in the number of launches, but the decrease in total tonnage is even more marked than that afforded by a comparison with last year's figures. The average size of the ships launched during the late half-year was 731 tons; in the first half of 1875, 829 tons; and in 1873, 1591 tons. Or to show it otherwise. For the half-year just ended, there is a reduction of 23,500 tons compared with the same period of 1875, and 43,500 tons less than in the first half of 1873.

Half Year.	Vessels.	Tons.
1876	121	88,500
1875	135	112,000
1874	93	129,000
1873	83	132,000

Among the new vessels, however, ordered by the Admiralty are a 12-gun double-screw iron armour-plated ship of 7323 tons and 6000 H. P. engines, to be named the *Nelson*, building by Messrs Elder & Co., and a sister ship to be christened the *Northampton*, building by Messrs Napier & Sons. Both of these vessels are to be delivered by the con-

tractors on or before March, 1877. We give beneath a list of the principal yards on the river as observed in sailing from Glasgow to Greenock. (R) means right bank ; (L) left bank.

Firms.	Locality.	Years Established.	Acres Covered.	No. of W'rkmen.
R. Napier & Sons.....	Govan (L)	—	24	3500
Barclay, Curle, & Co...	Whiteinch (R)...	52	11	1900
J. & G. Thomson.....	Dalmuir	—	32	1800
Dobie & Co.	Govan (L)	—	—	—
A. & J. Inglis.....	Pointhouse (R)..	27	—	1500
Henderson Brothers...	Partick (R) ...	39	20	1700
John Elder & Co.....	Fairfield, Govan	14	42	3600
Wingate & Sons.....	Whiteinch	53	12	1000
Stephen & Sons.....	Linthouse, Gvn.	52	32	2400
Simons & Co	Renfrew	58	13	1000
M'Millan & Son.....	Dumbarton	40	5	800
Denny & Brothers	Do.	30	14	2300
Blackwood & Gordon..	Port-Glasgow ...	24	8	900
Duncan & Co.....	Do.* ...	—	6	800
Murray & Co... ..	Do. ...	—	4	300
Robert Steele & Co...	Greenock.....	78	—	1300
Caird & Co.....	Do.	33	20	3500

* In this yard, John Wood built and launched, in 1812, Henry Bell's *Comet*.

THE BRIDGES.

OF the means of communication between the north and south sides of the river, the most important are the bridges. Passing the old bridge at Rutherglen, which was built by James Watt, and referred to in a previous chapter, the Albert Bridge is first in view. The foundation-stone of the structure which its predecessor supplanted was laid in 1794, and the building progressed most satisfactorily until the November of the following year, when an alarming flood rose in the river, and carried away a great part of the bridge, the arches of which were, by this time, thrown, the spandrils filled, and the parapets nearly finished. But reconstruction was at once begun, and 1797 saw the work completed without further accident. A defective foundation, however, necessitated the erection in its stead of what was known as the Hutchesontown Bridge. This bridge was built in 1833 by Mr Robert Stephenson, C.E., of Edinburgh, at the expense of the proprietors of the lands of Hutchesontown, and was purchased by the Bridge Trustees in 1845 for £20,000. Messrs Bell & Miller, in reporting upon *its* condition, stated that in the 20 years prior to 1864, the bed of the river under the centre arch had been lowered no less than 12 feet by the scouring action of the river, principally after the weir was removed from the next lowest bridge; and

being now lower than the masonry of the piers, the bearing piles had become exposed to the action of the stream for a depth of $6\frac{1}{2}$ feet, thus leaving the bridge supported as it were upon stilts. It was also found that, 200 feet above the bridge, the floods in rolling over the weir, had scooped out a hole in the soft sand $30\frac{1}{2}$ feet below the level of the masonry of the piers, and 33 feet deep at low water; and that 100 feet below the bridge another hole had been washed out by the increased velocity of the river through the bridge itself, 13 feet below the masonry of the piers, and $15\frac{1}{2}$ feet deep at low water.

So much for the old Hutchesontown Bridges, most serviceable viaducts in their day between the foot of the Salt-market and Crown Street. The construction of the Albert Bridge was authorised in 1867; the foundation-stone laid with masonic honours on 3rd January, 1870; and the bridge opened for traffic in 1871. Its contract price was about £49,000. No need, certainly, of questioning *its* stability. The foundations, consisting of sunk cylinders, each 10 feet diameter, and filled with a concrete of sand and hydraulic mortar, were carried 80 feet below the surface to a thoroughly hard substratum. The bridge itself consists of three elliptical arches, formed of wrought-iron girders, the centre arch being 114 feet span, and the two side arches each 108 feet span. Its length is 410 feet; width, 60 feet; and curved rise, 1 in 70. Nor has the ornamental been overlooked. The carved capitals of the granite piers; the chaste centre pieces, showing the royal arms, of the spandrils; the rich armorial bearings which pleasingly relieve the parapets and sides; the bronze medallions of the Queen and the late Prince Consort that adorn the end abutments, together with

other minor embellishments, all combine to render the bridge as handsome as it is massive and substantial.

The Victoria Bridge, which comes next, had at least two venerable forerunners. Prior to the 14th century, a wooden bridge spanned the Clyde at or about this part (the foot of Stockwell Street) ; but this falling into decay, a stone structure in its stead was built in 1345, through the liberality of Bishop Rae—the pious Lady Lochow having paid the cost of one of the arches. The latter erection was called the Bishop's Bridge. It consisted of 8 spans, and was 12 feet in width. The population of the city at this date was only 2000, and for 400 years the Bishop's Bridge was the sole means of communication between the north and south banks of the river. In 1778, its width was increased 10 feet ; and in 1821 it was further improved by the addition of footpaths, supported on iron framings, which gave to the whole a width of 34 feet. But its fate was inevitable. The deepening operations of the Trust rendered its removal a necessity, and in its place the Victoria Bridge (a handsome structure with 5 arches) was erected at a cost of over £50,000.

A suspension bridge spans the river from the foot of Portland Street, capable of bearing a weight of 2000 tons. A sentence will suffice to describe the mode of construction which has been here, as elsewhere, adopted. Two land piers, with towers 45 feet high, are erected on each bank of the river, with an opening through them, in the form of an arch, of from 12 to 13 feet wide. The chains, which are suspended from the top of these towers, describe the segment of a circle spanning the river. The road-way in turn is suspended from these chains by vertical rods, carrying a framework of timber, and affording a foot passenger bridge

of 16 feet in width. These chains are stayed at the back of the towers by a solid pack of masonry, built 30 feet into the ground, and thus form an adequate back weight to the suspension bridge, which presents one span of 425 feet. In 1871, the bridge was thoroughly renovated and repaired at a cost of about £6000. The whole of the former work had, somehow, got warped and twisted (probably from the decay of the main beams of the road), which caused the bridge to oscillate fearfully under passenger traffic. Now, however, there is less of camber, and the roadway, which is, in fact, nearly level, consists of a trussed malleable iron framing planked with pitch pine, and asphalted on the surface. A railing of light lattice girders, with ornamental bosses, gives the structure an airy and elegant appearance.

Last of all, comes the Glasgow, or Jamaica Street, Bridge, with its seven arches—one of the widest river bridges in the kingdom. The foundation-stone of its predecessor was laid in 1768, and its own on the 3rd September, 1833. It is 560 feet in length, and 60 feet wide over the parapets. Its cost was £34,000. But besides these, the Caledonian Railway Co. have obtained the requisite Parliamentary authority for the construction of another bridge for the conveyance of their traffic over the river to a central station to be formed fronting Gordon Street. This viaduct, which has been designed by Messrs Blyth & Cunningham, C.E., Edinburgh, will run parallel to the Glasgow Bridge, and will be distant from it 100 feet to the west. Its entire length will be 700 feet, and width 59 feet. It will have a clear headway of 35 feet at high water, and when the tide is out of about 10 feet more. In style and appearance it will resemble the City Union Railway Bridge further east.

The cart and carriage traffic is accommodated by steam ferries—two at Govan, a third at Renfrew, and a fourth at Erskine. Those at Govan are in the hands of the Clyde Trustees. The first built is capable of carrying two loaded waggons or three loaded carts, with from 60 to 80 passengers. Its length is 45 feet, breadth amidships 29 feet, and breadth at ends 12 feet. It is constructed of six water-tight compartments formed by longitudinal and athwartship iron bulkheads. The machinery for propulsion consists of a pair of diagonal steam-engines of 29 nominal horse power, geared to the driving-wheel, and round the circumference of which is wound the drawing-chain, having its ends secured on each side of the Clyde. Originally, two auxiliary engines were employed for working the gangways; but these have given place to a large fly-wheel and barrel, wrought by hand, which reduced the pressure of steam required to work the boat from about 40 to 25 lbs. on the square inch, with a corresponding saving of coal. The boat crosses the Clyde in 90 seconds. Increase of traffic at this point lately compelled the building of another steam ferry. *It* is wrought by a double chain, and constructed for passengers occupying the centre space and cart traffic the sides. The ferries yield the Trustees a fair return. The total increase for 1871 over 1870 was £962; and the increase of 1871 over 1865 was £2934, being $46\frac{1}{2}$ per cent. The working expenses, however, have increased from 43 per cent. in 1865, when there were no steam ferry-boats, to 48 per cent.; but in this is included the rent of the Govan Ferry. The income for 1875-76 has been £500 less than that of the previous twelve months, and this reduction in the receipts is attributable to the diminution of the number of workmen who required to cross to the shipbuilding yards

on the south side of the river. With respect to minor improvements, it may be noted that turnstiles have lately been erected at the three most important harbour ferries, and fire-engines placed on board the two largest of the steam ferry-boats.

The project of a subway under the Clyde, from Anderston Quay on the north bank to Springfield Quay on the south, was recently brought forward under the auspices of two firms of London solicitors; and, although nothing came of the scheme, the utility of such a communication cannot be questioned. But this idea of the London adventurers was by no means new. It was urged as far back as 1864, shortly after the lamentable accident to one of the ferry-boats. Excitement at the loss of over 20 lives was high, and Mr James Deas, now Engineer to the Clyde Trustees, but then Engineer to the Edinburgh and Glasgow Railway Company, submitted a plan identical with that of the London capitalists. The scheme suggested the construction of an iron tunnel below the bed of the river, with steep slopes at either end, terminating in short flights of steps. Entrance to the subway—which, having steps and steep gradients, was intended for foot passenger traffic only—was to be gained by small cabins placed, on the north side, at the south-west corner of Clyde Street, and on the south side near the east end of Springfield Shed. The comparative completeness, however, with which the ferries then coped with the exigencies of traffic, together with the extensive character of other works imperatively wanted, led to the shelving of the project for a time when borings were made to ascertain the nature of the strata at the bottom of the harbour. But one or two awkward obstacles face the Trustees in such an undertaking;

the descent of 40 feet, for example, necessary for the passage under the channel, and the corresponding ascent on the other side. These, it must be admitted, are somewhat serious difficulties. Still, anything seems possible in engineering after the Mount Cenis triumph, and the thing will probably be done sooner or later.

THE HARBOUR.

APART from its *prestige* as the cradle of steam navigation, the Clyde is, perhaps, one of the most remarkable of rivers. Primitively it presented few natural facilities for development: a petty tortuous streamlet full of rock-beds, fords, and shallows—barriers which could not but render its improvement into a chief commercial channel a formidable undertaking. Luckily, however, the Glasgow Magistrates, even in their “swaddling clothes,” were men of unflinching energy and enterprise. Many interesting examples could be given of the progressive spirit, apart from the force and vigour of their municipal life. In 1653, their shipping harbour was at the bailliary of Cunningham, in Ayrshire; but in 1662, they purchased thirteen acres of land from Sir Patrick Maxwell, near the village of Newark, Port-Glasgow, on which they not only built harbours, but constructed a dry-dock—the first of its kind in Scotland. Turning then from the river to the road, they are found in 1743 attempting to set up a six-horse conveyance or “lando,” to be run between their city and Edinburgh once a-week in winter, and twice in summer. The step was a failure; but with 1749 came “The Caravan,” which accomplished the distance (forty-four miles) in two days. In 1760 followed the “Fly,” which did the journey in rather less than a day and a-half.

To our subject, however. Port-Glasgow, which, in 1710, was constituted the principal Customs House on the Clyde, could not be brooked as the harbour at which the Virginia-freighted vessels should, of necessity, drop anchor. Glasgow must be rendered accessible from the sea by water ; which simply meant that the Clyde must be widened, straightened, and deepened for the passage upwards of the great tobacco ships. Gigantic difficulties were, unmistakably, to be encountered in the prosecution of the scheme ; and the work was fully realised by the Council as one that must be arduous and protracted—a work, too, which they in their lifetime could only begin, and in the prosecution of which both present and future conservators would require, in the strictest sense, to feel their way. Yet the object sought—a triumph over nature—was a thing that must be accomplished, if engineering skill and effort could be found equal to the task. We shall hereafter show with what substantial success those aspirations have been crowned.

Captain Slezer, in his “*Theatrum Scotiæ*” of 1670, gives the shipping in Glasgow harbour as consisting of three fishing boats of ten tons each ; and in 1688 a small quay was erected between St Enoch’s Burn and Robertson Street, at a cost of £1670. But even sixty-six years later (in 1754), when James Watt came to the city, the Broomielaw had not grown beyond that petty harbour—262 yards in length. With these facts in view, one cannot but wonder where the necessity lay for the Privy Council Order of 1546, enjoining that the vessels belonging to Glasgow should not annoy the fleet of Henry VIII. of England, the Queen’s uncle. It was only rarely, and at long intervals, that the Clyde presented anything like the spectacle of a river. In 1712, on the occasion of a flood, it rose $18\frac{1}{2}$ feet above the ordinary tide ; and

in 1782 it rose to even 20 feet, when boats were rowed through the Bridgegate, Stockwell Street, and other low-lying parts.

At the outset of what was to be a notable engineering achievement, the Magistrates in 1755 appointed Mr J. Smeaton to examine and report on the navigable capabilities of the Clyde. After sounding the river at twelve different points between Glasgow and Renfrew, he gave the Hirst and Pointhouse Ford as its two shoalest places—the latter, with a hard, gravelly bottom, having only 1 ft. 3 in. of water at ebb tide, and 3 ft. 8 in. at high water. And then came his project for “deepening.” To secure $4\frac{1}{2}$ feet of water at the Broomielaw, he suggested that a dam and lock should be constructed at Marlin Ford. It was generally thought, however, that the mighty mountain, in its conception, had only brought forth a sort of mouse; and the result was the shelving of Smeaton’s scheme—a resolution which, though shrewdly judicious on the part of the Council, must have been somewhat galling to one who, if not at the head, was at least among the chief of his profession. And thus matters stood until Mr John Golborne, of Chester—justly accounted the ablest engineer of his day—came to the rescue. In 1768, he was similarly commissioned as Smeaton had been some thirteen years before. After the most careful examination as to how the river could be most effectively improved, he recommended that the channel should, by the construction of jetties, be contracted for a distance of about eight miles below Glasgow, and the bed of the river simultaneously deepened by means of dredging. At this time, the high water of neap, or scanty, tides seldom, if ever, reached the harbour; while, for the crossing of the river, the public had no less than seven fords at their command—one

being as far down as Dumbuck (twelve miles from Glasgow), and which had only a depth of 2 ft. at low water. From Port-Glasgow up to that point, there were, however, 12 ft.; and on the other side of the bar, where the channels united, the depth increased to 16, 18, and even 24 ft. Hence the conclusion that, if Dumbuck Ford were removed, vessels of considerable burden might, at quarter flood, come up to Dunglass Castle, while there would also be the certainty of a greater momentum being given to the re-flowing current. And with this same spot is associated the earliest deepening effort on record. In 1556 the inhabitants of Glasgow, Renfrew, and Dumbarton entered into a compact to work in the channel for six consecutive weeks, by turns, with the view chiefly of removing the ford at Dumbuck, together with the more prominent of the shoals; but the banks of the river not being walled, large quantities of silt were regularly washed down by the freshes, which materially counteracted the results of their operations.

Persuaded that the first condition of all progress was law, the Magistrates and Council in 1759 sought and obtained an Act of Parliament for a depth of 7 ft. of water at neap tides, and the levy of 1s per ton on all goods passing on the river between Glasgow and Dumbuck to meet the cost of the jetty and dyke erections recommended by Mr Golborne. Then followed the construction of numerous jetties (ridges of earth covered with stones) for the confining of the tide within the navigable bed of the river. And results in the right direction were soon apparent. Fishermen's wherries, or humble gabbarts, were no longer to be the great craft of the Broomielaw. In 1775, vessels drawing upwards of 6 ft. of water reached the harbour, which was 10 in. more than Golborne had guaranteed from his jetty system; and

for this achievement, the Trustees, in the December of that year, voted him the sum of £1500, and presented him at the same time with a handsome silver cup. In 1781, he reports the "established" depth of the river 7 ft. at high water.

We pass over the twenty years following. With 1798 came the appointment of Mr James Spreull as river superintendent—a man by character fitted not only to lead but to impel his Trustees to the carrying out of their aim and purpose, and who wisely and with untiring zeal concentrated his attention on the deepening of the channel. Ere many months had elapsed he clearly saw the weak point of Mr Golborne's scheme. Eddies were fast forming on the sides of the various jetties which had been shot out from the river banks, and these he counteracted by the addition of connecting or parallel dykes. Of a truth, nothing succeeds like success. Here was another engineering hit, though, in part, unexpected. By the formation of the dykes more than the object sought was gained. The early part of the tide was now brought up the river, and also a more uniform velocity given it throughout the channel. From this time the Trustees' progress year after year got more and more marked. In 1801, craft arrived at the Broomielaw of 40 tons burden; and in 1806 the *Harmony*, a vessel of 120 tons, drawing 8 feet 6 inches of water, came up the river with an ordinary spring tide. A good story, by the way, is told of one Sandy Lindsay, who, hailing from Loch Lomond, built an "elegant" ship of 30 tons burden for the express purpose of exploring the "wee bit burn ca'd the Clyde." On reaching the harbour at Glasgow, the daring navigator was presented with the freedom of the city.

In 1800, the quay, which only extended to York Street, measuring 1142 feet, was wholly on the north side of the

river ; and even in 1810 it had neither lights, sheds, nor police. It had, however, two cranes, and these were each capable of lifting a little more than a hogshead of sugar. An addition to the quay was made in 1815, which increased its length to 2080 feet, and at this period we find vessels drawing 9 feet 6 inches of water reaching the Broomielaw from the sea. In 1825, the depth of the harbour itself was increased to 13 feet; and by 1834 dykes had been constructed on the south side of the river from Glasgow to West Ferry, and on the north side from Glasgow to Bowling. But although not the most pressing want of the navigation, the extension of quayage was not overlooked during all this earnest endeavour for deeper water. By 1823 it had reached Clyde Street, and in 1827 was still further extended to Hyde Park Recess, giving a total length of 3342 feet. Up till this date the quay was still wholly on the north side of the harbour; but, in 1828, a south quay was commenced and built forward to West Street, a distance of 1287 feet.

Such were the earlier efforts of the Magistrates and their colleagues towards the improvement of the Clyde. By Consolidation Act, 1858, the interests of the navigation and harbour were vested in Parliamentary Trustees. Their jurisdiction extends from the Albert Bridge to Newark Castle, Port Glasgow. And it must be admitted that, upon the whole, they, too, have prosecuted their work with great prudence and energy. Much has been done, and that to good purpose, in a comparatively short period. According to an old captain, the stones in the bed of the river could be distinctly seen below Dalmuir, in 1841 ; and he also remembers having witnessed boats “shoved” up the channel at the bends with poles—the time taken between Dumbarton and Glasgow being usually seven hours. Even in 1819, boys were

in the habit of wading across the stream at Govan. The depth contemplated for the whole length of the river is 15 feet at low water, which will give 24 feet of high water at spring tides, and 22 feet at neap tides. And here two questions plainly claim the attention of the Trustees. Whence comes the deposit which is constantly silting up the river basin? Such accumulations unmistakeably arise from *debris* carried down the river during floods, and from sand bank and shingle beach material carried upwards by the tidal action. Then further: How is the deposit to be minimised—what the best means of scouring and keeping the river free of shoals? Of this we speak under another chapter. But in addition to this deepening work, systematic attention is also given to cutting, excavating, and embanking. In 1840, the width of the harbour at Napier's dock was 150 feet; now it is 490 feet, and vessels of 1500 tons burden float freely where, at that time, stood one of the largest cotton mills in the city. Twenty years ago the width at Renfrew was 245 feet, and at the mouth of the Cart 275 feet; at the former place it is now 410 feet, and at the latter 515 feet. Much has also been, and is still being done by way of filling up the lands that stretch back from the river banks. Plantation grounds have been thus raised down to the east end of Govan. Those at Meadowside, Merklands, Partick, and Scotstoun, have likewise been filled up back to the Dumbarton Road, fully 12 feet of soil having been added to them in certain parts. And down the whole length of the channel, field after field—it might almost be said estate after estate—which were previously barren and marshy wastes, are rich in fertility through the top soil given them from the river dredgings.

The harbour proper, which may be described as consisting

almost entirely of quays faced with the river walls, is about three miles in length, and comprises 150 acres of water space. As regards quay room, the Trustees have certainly failed to keep pace with the progress of commerce. As quickly as one vessel leaves, her place is occupied by another. It is, in fact, a matter of common occurrence to see upwards of 40 vessels waiting to be berthed. Several extensive works, however, have lately been executed to lessen this grievance. And the most important of these was, undoubtedly, Plantation Quay, which, extending from Mavisbank Quay westwards for fully 700 yards, was completed in July, 1874. The whole frontage to the south side of the Clyde, from Glasgow Bridge to Kelvinhaugh Ferry, a distance of 1 mile 950 yards, is thus now lined with quays; the only break in the continuity being the entrance to Kingston Dock. This wharf wall at Plantation deserves special notice as being the first founded upon the cylindrical system. For centuries, brick cylinders have been in use in India, and Mr Bateman, consulting engineer, and Mr Deas, resident engineer to the Trust, with a view to obtain a greater depth of water than could be had alongside the existing quays, suggested that these, as an experimental work, should be adopted for the first 400 yards of Plantation Quay. The result was that, in 1870, an arrangement was made with Mr John Milroy, in conjunction with the late Mr Brassey, to have the suggestion of the engineers carried out in the construction of the new wall. This portion of the undertaking was successfully and satisfactorily completed towards the end of 1872, when the contract for the further extension of the quay to Kelvinhaugh Ferry was let to Mr Milroy. A few particulars relative to the work may not be uninteresting. The wells were 12 feet in external diameter, and 2 feet

4 inches thick, thus having an internal diameter of 7 feet 4 inches. Their shape was circular, except at the points of contact, where they were formed with tongue and groove, *i.e.*, a square projection fitting into and sliding in a corresponding recess in the adjoining well. From the bottom of a trench, which was cut down nearly to the level of low water, the cylinders were sunk about 36 feet; but the earth on the river side was removed when the sinking was completed, and dredged to a depth of 20 feet below low-water level, thus leaving a length of about 14 feet of cylinder beneath the dredged bed of the river. The cylinders were only carried up 2 feet above low-water mark; a plug of concrete was then lowered to the bottom of each cylinder, to give it a proper bearing, and to protect the rest of the filling from disturbing influences when the cylinders were refilled with the sand and other materials which had been excavated. On this foundation, suitably prepared, the rest of the quay was built as an ordinary retaining wall. The shoe, which was devised by Mr Milroy, consisted of a short length of iron cylinder, about $4\frac{1}{2}$ feet deep, surmounted by an annular plate about 18 inches in breadth, which was also supported by radial brackets. The cylinders were sunk by Mr Milroy's patent excavator. The value of this ingenious apparatus in excavating operations is now widely appreciated, the machine having found its way even to bridge work in Cairo, and the fact of no pneumatic apparatus or pumps being here required, in the sinking of cylinders, for the purpose of keeping back the water, the universal adoption of Mr Milroy's patent for general excavations in or under water is only a matter of time. Both as regards speed and quantity of work, it far outstrips any other excavating apparatus of the day. For example, with a cylinder

8 feet 4 inches, and an excavator 5 feet in diameter, the rate of sinking at Clyde Bridge was 4 feet per hour, or (including fresh lengths of cylinder, weighting, caulking, &c.), about 12 feet per day of ten hours, and as much as 25 feet of cylinder have been sunk in the ten hours. Then at Plantation Quay, 100 cylinders were sunk to an average depth of 40 feet in 76 weeks, passing through such beds of material as rotten freestone and fine sand, in which boulders of whin and freestone weighing from 6 to 12 cwt. were frequently met with. These, notwithstanding their weight, were seized and brought up by the excavators. The machine is octagonal in plan, and measures 5 feet 11 inches inside, and 5 feet 6 inches across from side to side of tray, which is 10 inches deep, and holds 19 cwt., or 18 cubic feet, of material when loaded flush at top.

In 1872 a timber wharf, 1212 feet long and 25 feet broad, was constructed at Yorkhill for the Trustees by Mr Hugh Kennedy, Partick, as a substitute for one at Stobcross displaced by the new tidal docks. In this wharf there are 608 main piles—203 in the first, 203 in the second, and 202 in the third or land row. Bay-driving was here resorted to by the contractor, and what that is may be gathered from a brief description of the work. Three rows of main piles are first driven the whole length of the proposed wharf. These piles are 12 inches square, and are driven into the bed of the river at a distance of five feet from each other. The space between each of these piles, facing the river, is called the bay, and is filled up with sheet piles, which give a compact finish to the work. The custom formerly was to drive each of these sheet piles—of which there are five in each bay—separately; but in driving the bay with its piles braced together by hoops, dowels, and dogs, and provided with a common shoe,

the soil is displaced only in front and behind, instead of on all four sides. This principle was adopted in 1866 by Mr Manwell in the construction of the dock at Windmill Croft; and in 1867 Messrs J. & A. Waddell showed the feasibility of driving large bays at the works built under their superintendence at Rothesay. At that place £10,000 was expended in adding a portion to the face of the old stone wharf. The piles were eight feet from centre to centre, giving a breadth of bay of seven feet, or two feet wider than those at Yorkhill. On that occasion the sheet piles were driven in bays 21 feet down, and this still remains the greatest feat of the kind which has yet been achieved.

Then as to traffic facilities. For loading and discharging purposes numerous cranes are distributed over the quays. At Plantation there is a 60-ton crane, which is by far the most powerful belonging to the Trustees. The crane seat, which forms a portion of the wall, rests on 12 concrete cylinders, 2 feet 4 inches thick, and 12 feet external diameter, in three rows of four each. The seat, up to nine feet above the quay level, is perpendicular, and measures 44 feet by 38 feet, but above this height it is reduced to 36 feet by 34 feet, and is stepped up on three sides to the top, which is 32 feet square. The weight of the masonry above the cylinders is estimated at 3800 tons, and above the level of the washers of the holding-down bolts 1940 tons, and of the crane without load 150 tons. The crane is reached by iron ladders, and they have been so placed as to prevent unauthorised access. It has a sweep of 48 feet, and the greatest height of lift is 58 feet 9 inches. The crane is capable of raising a load of 60 tons at the rate of 3 feet 10 inches per minute, smaller loads being hoisted at a greater speed. It was constructed by Messrs James Taylor & Co., Birkenhead, from specifica-

tions furnished by Mr Deas. At Finnieston Quay there is another crane, capable of lifting 30 tons, with $23\frac{1}{2}$ feet sweep. Kingston Dock has the advantage of a 5-ton crane; while, in addition to these, eleven of a lighter sort are placed in the less important parts of the harbour. An interesting and ingenious piece of mechanism, in the shape of a weighing apparatus, was, in 1871, attached to the chain of each of the larger cranes. The little spherical machine closely resembles the ordinary pressure-gauge of a steam boiler; its principle of action, in fact, is the same. A piston-rod passes downwards through an open top cylinder filled with oil, and from the bottom hangs an eye for the attachment of material, the weight of which is indicated on a dial gauge through the pressure or strain of piston. The machine, which of itself only weighs some 84 lbs., denotes with the nicest accuracy quantities from 1 cwt. up to 10 tons.

Lately, Bailie Scott, a member of the Trust, suggested to the Harbour Committee the utilization of the north quay, between the Jamaica and Stockwell Bridges, for river steamboat traffic. Accommodation in waiting and parcel receiving rooms would certainly be a great convenience to the public, who, at present, are obliged either to stand on the open quay, or take refuge in a goods shed. Funnels wrought on the telescope principle would get over the difficulty of taking a certain class of vessels through the bridge, and there can be no doubt that the steamboat owners will in this matter meet the Trustees in a co-operating spirit. But while such a station would be for the benefit of all concerned, the Committee on the subject have been compelled reluctantly to report that only one of the existing fleet of steamers could pass under the Bridge at high water, which effectually disposes of the proposed locality for the present, and may lead, by way of

alternative, to a thorough re-organisation of the upper quays. It should be noted, however, that the River Trust have recommended the running of a line of penny steamers from the bridge to Renfrew, touching at Stobercross, Whiteinch, and Govan. As that route supports 500 horses, and two lines of omnibuses at fourpenny rates, there is no question that penny boats, from their economy and capacity, would pay as well as the Clyde ferryboats, and when the weir is removed, the trips could be extended as far up as Rutherglen. On the Thames, the Seine, the Elbe, and the Garonne, penny steamers have been running successfully for many years, and they are so small and of such light draught of water that they would not in the least interrupt the Clyde traffic. On the Thames the larger passenger steamers stay well down the river, and the passenger traffic, as feeders, is carried on above that by these penny boats. With Renfrew as a terminus, why should not the same arrangement be adopted on the Clyde?

THE DOCKS.

THE deficiency of dock accommodation has long been a matter of general complaint amongst shipowners and shipbuilders. Lately, however, the Trustees acquired Lancefield Dock, from Messrs Napier for the sum of £35,000, which gives them the entire control of the north side of the river. On the south side, the first work of importance met with is Kingston Dock. The swing bridge of this tidal basin, which was opened in October 1867, has a span of $82\frac{1}{2}$ feet, and affords on each side two lines of roadway for passengers and carts respectively. Crossing obliquely, its longest girder is on the side towards the river. As a balance, it carries a load at its short end, and is also provided with rollers which run on an inverted rail. Its cost was upwards of £12,000. The area of water within the dock is 51·5th acres—the quays extending to 830 yards in length.

Although the contract for the graving dock at Salterscroft was let in 1869, it was December 11th, 1875, ere the work was opened for the examination and repair of ships. Various vexatious delays—causes over which the Trustees could exercise no control—protracted its completion. Water welling up through sand and gravel from bottom springs, and which could not be kept under even with pumps throwing out day and night some 1250 gallons per minute, rendered

one half of the brick invert which had been built entirely useless; and this difficulty between the contractor of masonry and the engineers was not easy of adjustment. At length, however, a perfectly water-tight arch was obtained by the substitution of Portland cement in the building in lieu of cement mortar. Then another serious interruption followed on 2nd January, 1873, when an unprecedentedly high tide rushed up the river, broke over the strong embankment which had been raised to protect the dock, and forced its way into the unfinished basin. Pumps were disabled; pump rods destroyed; strong travelling cranes overturned; while, in fact, everything that could float was borne to the surface, filling the whole building with *debris*. But the dock may be described as having been virtually completed 18 months ago. Its opening was deferred for at least a year to allow time for the construction of a culvert, consisting of cast-iron pipes, 5 feet 9 inches internal diameter, encased in Portland cement, and which is intended for the emptying of this and the dock shortly to be built alongside of it. A saving of about £9,000 will thus be effected.

Need we say that the dock now open supplies a want which has long been keenly felt? It affords ample room for the berthing of two vessels of ordinary dimensions. It measures 560 feet in length along the bottom, having 90 feet 6 inches width of coping, 72 feet width of entrance, and the extreme depth on the sill at high water of neap tides is 20 feet, and 22 feet at spring tides. Of the eighty-five docks in various ports there are only fifteen larger, eight with a little wider entrance, but none at ordinary tides that are deeper. Ashlar has been used for the laying of the base, which in formation is somewhat convex, in cross sections, and has a perceptible inclination towards the inner wall.

To insure strength and durability, the caisson cheek and the coping have been built of granite, while freestone has been employed in the other mason work. The necessary pumping station has been erected at the north east point of the dock. There are four pumps, furnished with large boilers and machinery for working the capstans, sluices, and other apparatus. These pumps can discharge the whole volume of the water contained in the dock at its full depth in 2 hours, the quantity being upwards of $5\frac{1}{2}$ million gallons, equal to nearly 24,800 tons. The cost of the whole work has been well-nigh £90,000. The engineers were Messrs Bell & Miller; the contractor for masonry was the late Mr William Scott; for the pumping machinery, Messrs Easton & Anderson, of London; while the caisson was constructed by Messrs Hannah, Donald, & Wilson. The second dock, which was authorised by Parliament in 1873, has not yet been begun. In proportions it will be considerably larger than the present one, the proposed length being 575 feet.

Between Salterscroft and Dumbarton there is only one graving dock—the private property of Messrs Henderson Brothers. The following are its dimensions: Length of floor, 500 feet; width of entrance, 56 feet; depth on sill at high water ordinary spring tides, 18 feet; at high water ordinary neap tides, 16 feet; and at low water, 10 feet. Some three years ago, the shipbuilders of Whiteinch, supported by numerous shipowners and merchants, submitted plans for the laying out of 38 acres—of which the water space would be 19, the quayage 2070 lineal yards, with extensive grain stores adjoining—in a series of docks at that point of the river. By a combination of the graving dock and pontoon system, they proposed to attain all the objects of graving docks at much less than the usual cost. The Clyde

Trustees, however, evinced no disposition to further the scheme of the memorialists.

Of the works on the north side of the river, the Stobcross Docks are first in importance. These are situated between Finnieston Street and Sandyford Street, and when finished, three years hence, will afford six times greater accommodation than that of Kingston Dock, besides practically completing a continuous harbour line on the north side of the river from Victoria Bridge to the Kelvin—adding, in short, nearly one-half to the present quayage of Glasgow harbour. The basin is to be a tidal one, with a depth of 20 feet at low water, so that it may be used for ships of the greatest draught. The entrance will be from the western end, crossed by a swing bridge, while access to a quay 200 feet wide in the centre of the docks will be obtained from the east end. The docks will be 3000 feet long and 700 feet broad, inclusive of the central quay. The Trustees some time ago provided for the construction of the most important section of the docks, being one-third of the whole undertaking. The contractor for this work is Mr T. S. Hunter, lessee of Craigleith Quarry, who, in 1859, built the eastern harbour at Granton; afterwards the harbour at Queensferry; and latterly erected the Chickens Lighthouse, Isle of Man. The price to be paid him by the Trustees is £159,421. The portion of the docks thus nearing most successful completion will comprise 3000 feet of quay, including the river breast as well as the internal walls, and will give 7 acres of water space. Previous to the contract being taken up, careful borings were made at distances of 100 feet along the line of quay walls, with the view of ascertaining the nature of the strata. On the north side of the dock, it was found that the soil was composed of boulder till, while on the other

sides the borings revealed deposits of sand, gravel, and silt, the rock being reached at depths varying from 80 to 100 feet. The quay wall on the north side will be built in the ordinary mode, and founded to the depth of 41 feet below the level of the quays, but where the bed is of sand, the foundation will consist of a double row of concrete cylinders, 9 feet in external diameter, and sunk to the depth of 50 feet below the finished quay level. The cylinders will be constructed in segments made on a platform at the works. In proceeding to construct the quayage, a trench is first excavated along the line of wall down to about the level of low water, into which are placed "shoes" of cast or malleable iron, in the option of the contractor. On the top of the shoes is placed the concrete work of the cylinders, and when it has been completed, the cylinders are sunk to the required depth, and the superstructure of masonry is added. The latter consists of heavy ashlar face work and concrete rubble backing. Rubble backing is a novel feature in quay wall masonry, this being the first occasion, we believe, on which it has been adopted in Scotland. We may mention that one of the conditions on which Mr Hunter obtained the contract was that all the ashlar should be taken from his well-known quarry at Craigleith.

The relative plans of the undertaking were made out and deposited by Mr Deas in the latter part of 1869, and received the sanction of Parliament in June, 1870. We observe that Mr John Morrison, builder, has been selected as the contractor for a further portion of the works.

In connection with the docks, tramways will be laid, commencing at Sandyford Street, and running eastwards along the whole length of their northern division. It is also proposed to extend the tramway system along both sides of the

river—from Jamaica Street Bridge to Kelvinhaugh on the north side, and from the same point to the entrance of the new graving dock on the south ; by which means trucks from all parts of the kingdom will be readily and directly brought alongside ships lying in the harbour. The description of tramway to be adopted has been on trial for the last four years by the Trustees, both at the General Terminus Quay crossing, where there is a heavy coal traffic in connection with the Caledonian Railway, and along the south side of Mavisbank Shed. Each tramway length, consisting of a cast-iron block 4 feet long, 6 inches deep, and 14 inches broad, has a running groove from end to end, along which travel flanged wheels, such as are common to railway wag-gons ; while vehicles with ordinary wheels pass along the plates, which are notched for the feet of horses, and which can be crossed at any angle without the slightest risk of the ordinary wheel falling into the groove. Then, again, when the gauge of flanged wheels is less than those of a cart or lorry using the tramway, the blocks, instead of being grooved, have simply their inner edge “stepped down”—the gauge being settled by the insertion of cross ties.

The construction of the docks necessitated the diversion of the Pointhouse Road from Finnieston Street, which is now made to run in a line with Stobcross Street, a work which involved 300,000 cubic yards of excavation. The greater part of the cutting was through strata of clay, sand, and gravel, deposited in beautiful wave-like layers ; but at the west end of the diversion boulder-clay was encountered, and here the spade had to give way to the pick. In some places the excavation was made to a depth of fully 40 feet.

THE DREDGING PLANT.

WE now propose to give some account of the dredging plant in its appliances and results. The first steam-dredger started work on the river in 1821, and this machine, after having been lengthened three years later, was found capable of dredging to a depth of 15 feet. Prior, however, to its introduction, the deepening work was performed by a porcupine-plough; which for the breaking up of the soil was, with a couple of horses in yoke, placed on the projecting banks at low water—the loose earth being carried away by the after-current. Another principle adopted for deepening was that of harrowing on the occasion of a “fresh.” Here, again, the *modus operandi* was equally simple. The harrow, by means of tackles, was hung at the stern of the *Industry* or *Despatch*, the steamer, proceeding with the current, having the deepening apparatus at work behind. Following the plough came a large square punt fitted with dredging appliances—these being wrought by an ordinary horse-gin. The “bag and spoon” was a dredge which the Dutch at a very early period employed for the deepening of their canals. It was simply a ring of iron, about 2 feet in diameter, flattened and steeled for about one third of its circumference, having a bag of strong leather attached to it by leathern thongs. The ring and bag were fixed to a long pole, which, on being

used, was lowered to the bottom from the end of a barge moored in the canal or river. A rope made fast to the iron ring was then wound up by a windlass placed at the other end of the barge, and the spoon was thus dragged along the bottom, and was guided in its progress by a man who held the pole. This process, however was slow, and only suitable where the depth of water was limited and the bottom soft. An iron bucket slung between two barges was another early and now obsolete plan of dredging, which was worked on the Tay till 1833. Steam-power, however, soon asserted the mastership. A second steam-dredger commenced work in 1826, a third followed in 1830, and a fourth in 1836. The depth in the harbour at low water was now from 7 feet to 8 feet ; the lift of a neap tide, 4 feet ; and of a spring tide, about 7 feet. And with the deepening of the channel there had happily been a gradual acceleration of the tidal wave. For example—in 1800 the flow took two hours to ascend from Port-Glasgow to the Broomielaw, being at the rate of nine miles an hour ; whereas the same distance was now passed over in an hour and twenty-three minutes, or at the rate of fourteen miles an hour. In 1852, the minimum depth of the harbour at low water was 12 feet ; at high water of neap tides, 18 feet ; and of spring tides 20 feet.

No. 1 of the present fleet of six dredgers was built in 1850. This machine, which was originally 99 feet 4 inches in length, 32 feet 3 inches in breadth, and of 40 nominal horse power, dredged in a depth of $22\frac{1}{2}$ feet, and turned out about 70 cubic yards of material per hour of work. In 1875, it underwent considerable alterations at the 'Trustees' works, Dalmuir, where 260 men are employed. About 100 feet were added to its length, and instead of small single buckets it now carries double buckets similar to those of No. 6. From its top-

weight, which is now something immense, this machine will no doubt be kept chiefly at work in the harbour. Nos. 2, 3, and 4 dredgers were sold. No. 5 and No. 7 are both small machines, and load punts of rectangular construction. These latter have an extreme length of 32 feet, a breadth of 15 feet, and depth of 3 feet. The bow punt of the train, however, is 33 feet long by 30 feet broad, and lies 3 inches deep at stern. The stern punt is 16 feet 6 inches long and 15 feet broad. In 1858, the Trustees had 377 of these craft. No. 6 and No. 8 dredgers are large machines, and load barges. The former, which has a double ladder, is of 40 horse power, and dredges in a depth of 26 feet. Her cost was £13,295. The latter (No. 8), with single ladder, is of 75 horse power, and dredges in a depth of 28 feet. Her length is 161 feet, breadth 29 feet, and depth 10 feet. She was built in 1865, and cost £17,652. During the year 1870-71, this dredger lifted 430,240 cubic yards of material (sand, silt, till, and gravel) in 2420 hours of work. Her bucket ladder is 90 feet 9 inches between centres, her cylinder 48 inches in diameter, and stroke 3 feet. No. 9 was launched in 1871. Her deck length is 161 feet, breadth of beam 29 feet, and depth amidships 10 feet. She looks a ponderous machine. The capacity of each of her buckets (and she has 39 on the chain) is 14 cubic feet; and, by working at ordinary speed, she lifts about 300 tons of soil per hour.

The first of the steam hopper barges, for the carriage of dredgings to deep water, was introduced in 1862. Previously, the mud lifted was cast into punts, and towed by a tug-steamer to sea. For a considerable time it had been a perplexing question with the Trustees as to how the dredgings could be most economically disposed of. Barges had for a long series of years been in use at Newcastle, Sunderland,

Dublin, &c., but these had no self-propelling power. What was wanted, then, was a screw barge which should, of itself, carry its load to the place of deposit. Two such barges commenced work in 1862, having cost £7600. An additional couple followed in 1863, for which the contract price was £8790; and these mud conveyances, supplemented annually, now number 14, and are each capable of carrying daily to the mouth of Loch Long, where the depth of water is 200 feet, about 300 tons of material. A more suitable discharging bed could not have been selected. At the further end of the loch there is no outlet, and it consequently has no through navigation. There is also little play of tide within it, so that the dredgings deposited run no chance of being carried back into the Firth. When the dredger is working in sand, each of its four attendant barges takes between three and four hours in loading. No. 10 is the fastest of the fleet. Her speed to discharging quarters is about $8\frac{1}{2}$ knots per hour—still-water average; her draft forward being 11 feet, and aft 11 feet 2 inches. It is, perhaps, unnecessary to add that the barges discharge through flap-doors at bottom. Formerly, these were opened and closed by means of hydraulic gearing, but this proved useless in fresh water during frost; and now, with the exception of Nos. 1 and 2, all the barges have ratchets wrought by hand for releasing the upholding chains of the doors. In 1874, a beautiful and complete model of a Clyde barge was constructed by an old and highly-respected servant of the Trustees—the late Mr Chas. Duncan—who at that time lived at Clydebank, Yoker, in pensioned ease and comfort. We understand that it is contemplated to have this interesting specimen of mechanical skill placed in the Kelvingrove Museum.

Besides their 6 dredgers, 14 barges, 262 punts, and 77

row boats, the Trustees have also 2 diving-bells for the lifting chiefly of boulders encountered by the dredgers in the river bed; likewise a tug for towing purposes, which commenced work in 1851. The extreme length of the latter over all is 105 ft. 10 in ; and it is of 80 horse-power. It has two condensing steam lever engines, connecting and disconnecting, so that the paddles can be turned in contrary directions at pleasure.

Such, then, is the plant at command for the deepening of the Clyde—a work which will become every year more and more imperative in its claims for attention. We will now glance, without going into matters of detail, at the value of the work performed. The quantity of material lifted depends much, of course, upon the character of the soil with which the dredger is engaged. It may be in soft mud ; or, as more frequently happens, in hard ground. For the year ending 30th June, 1875, the total dredgings from the harbour and river were 1,130,000 cubic yards—part of which was carried to sea, and part deposited on land. The cost of lifting (taking No. 8 dredger's bill for the year) is 2·60 pence per cubic yard ; and for the conveyance of dredgings, by barges, 5·36 pence. For wages, coal, and stores she cost £1232 ; and for repairs, £1670. Working ordinary time, about 2400 hours is the most that can be got annually from any dredger. Repairs are frequently required. But to sum up. During the last twenty-six years, the Trust have expended £500,000 in lifting from the river 12,712,996 cubic yards of soil.

In passing, it may be noted that a promising hopper-dredge was recently patented and built by Messrs Wm. Simons & Co., Renfrew. This machine, as its name suggests, combines the apparatus for raising material with a screw hopper vessel

for conveying it to the place of deposit. We could imagine such a craft of great advantage in the saving of expense where dredging can only be prosecuted at certain states of the tide, in the removal of bars, or at the harbour quays where deepening must be confined to the hours that the berths are vacant. But the dredger by itself is better adapted for continuous working, and where the lifting is extensive. To save ridges being left, it is, in fact, imperative that the machine should not quit the ground until it has been all systematically overtaken.

THE CHANNEL.

FROM the nature of its bed, the deepening of the channel has been tedious work. At Partick, which lies about three miles down from the Broomielaw, there is the first of a hard blue till thickly set with boulders. Several of these which were lifted lately weighed over six tons. But the Elderslie Rock proved one of the most formidable obstacles to the navigation with which the Trustees have had to grapple. And its existence was unknown until the spring of 1852, when one of the Glasgow and New York line of steamers grounded on it and damaged her bottom. At first it was simply taken for a large boulder; but future borings showed that the bed of whinstone, for such it was, extended over an area of 900 feet in length by 300 feet in breadth. In 1860, the blasting of this jagged barrier was begun. Bores, charged with from 6 to 12 lbs. of gunpowder, were put down in parallel rows right through the rock; while the firing was effected by means of a powerful galvanic battery. Dynamite—the invention of Mr Nobel, a German—was, however, latterly used in the blasting of the barrier, and brought about its complete removal. This composition, of which nitro-glycerine forms the basis, will doubtless be more resorted to by and bye in submarine blasting. Although when placed in the fire it smoulders away leaving only a

white ash, it explodes by percussion with a force many times greater than that of gunpowder.

Renfrew, for a considerable period, held extensive fishing privileges on the Clyde. Salmon were abundant, especially in the upper reaches of the river, and many a fine specimen was landed at this spot. Even now, the Trustees pay over £200 annually to the royal burgh for the loss it has sustained in this trade. It received its charter from Robert III. in 1396, and in 1614, James VI. also granted it a charter for a school. The title of the Prince of Wales and Duke of Rothesay, namely, Baron of Renfrew, arose in the days of the Stewarts, about 1120. David, King of the Scots, the First, about that time conferred the Barony of Renfrew, called also Strathgryffe, which was as extensive as the modern county of Renfrew, upon Walter, the son of Allan of Oswestrie, in Shropshire, on the borders of Wales, and he granted on Walter the office of Stewart of Scotland. At one time, the old burgh had a good foreign connection, and latterly traded to a moderate extent with Ireland. But now it is nowhere commercially. It has gone quietly to sleep, and is likely to rest on its oars until embraced in the arms of the advancing city. Its population in 1755 was 1091; in 1798, 1628; in 1800, 2031; and is now about 4200.

At Dalmuir, about eight miles down, the depth at low water is 15 feet. Here, on the north side of the river, the Trustees have their building-yard and principal workshops; likewise a patent hydraulic slip. Comparatively little is done in the construction of new plant, but the works are quite equal to the repair demands of dredgers, barges, and ferry-boats. And here is the first of the lighthouses. A second follows at Rashielea, where there is a rich quarry of whinstone, which is punted out for the building of the river

dykes. These extend from Govan to opposite the mouth of the Leven at Dumbarton. Originally, their slope was about 2 feet to 1 foot; but the pitching now given is from $1\frac{1}{2}$ foot to 1 foot. There can be no doubt that these training walls have contributed materially to an efficient scour in the channel. The remaining lighthouses on the river are four—one at Donald's Quay, another at Dumbuck, a lightship at Garinoyle, and the sixth and last at Cardross. At North Barr the bottom is very hard. No. 6 dredger (and the single machines are best adapted for tough ground) has occasionally wrought here for six hours and only loaded three punts, representing about 24 cubic yards of material. Down to Erskine Ferry the bed continues of hard red till, and increases in boulders. The tons of large stones that have been lifted from this part of the river by the diving-bell must be reckoned by thousands, and many of these rock-fragments have weighed, and still weigh, as much as seven tons each. Oak trees, fresh and full grown, also turn up at intervals; while those who have been personally engaged with the dredging could give the antiquary many a good bone to pick. Deer-head skeletons were at one time common in the buckets.

We have passed several picturesque spots, but it is at Old Kilpatrick (the birth-place of Ireland's patron saint?) that the opening glimpse is got of rare scenic beauty. Northwards, Dalnottar Hill and a fine range of uplands rise from the village valley, and stretch with many bosky crests westward to Dumbuck (the hill of roes); while immediately to the south lies Erskine House, the charming seat of Lord Blantyre. The hills here, with an upper stratum of whinstone incumbent on alternate layers of limestone and schistus, form part of a remarkable ridge that run eastward to the

vicinity of Stirling. After an interruption there to give a passage to the Forth, they extend, under the name of the Ochils, to the Firth of Tay, where, after another break for the channel of the river, they proceed north-eastward from Perth as the Sidlaw Hills. Beyond the Clyde, the same range seems to be continued westward by Greenock; hence the supposition that this river has also found a passage across their tract. We referred, a few sentences back, to the magnificent view which is got from the Kilpatrick bend. Let us only add that nothing in its way could be finer than the river panorama that must here arrest the dullest eye.

Bowling is a point of some note—first as the western terminus of the Forth and Clyde canal. No doubt the increase of trade between the east and west coast of Scotland, together with the great expense of carriage by land, led to the project of thus uniting the eastern and western seas. The work, from the many difficulties which were encountered in its execution, was most appropriately called the “Great Canal.” Rocks, quicksands, roads, and rivulets had all to be overcome in the line of the navigation; but on July 28th, 1790, the canal, having taken 22 years for its completion, was triumphantly opened by the symbol of a hogshead of water from the Forth being poured into the Clyde. The operations were commenced at the east end on 10th July, 1768, under the direction of Mr Smeaton, when Sir Lawrence Dundas of Kerse performed the ceremony of cutting and removing the first spadeful of earth. Some idea may be formed of the nature of the undertaking from the statement that the canal in its course of 35 miles passes over 40 aqueduct bridges, and is crossed by 33 draw bridges. The largest of the former is that over the Kelvin which was begun in June, 1787, and finished in April, 1791, at a cost of £8509.

It consists of 4 arches with a height of 83 feet—the valley spanned being upwards of 400 feet in breadth. Mr Robert Whitworth was at that time engineer, and with great energy and skill conducted the whole work till its completion. The medium width of the surface of the canal is 56 feet ; of the bottom 27 feet ; while the depth throughout is 8 feet. Between Grangemouth and Port Dundas there are 20 locks, and 19 between the “great aqueduct” and Bowling Bay.

Although at one period the funds of the Company were in such a depressed state that the stock frequently sold at 50 per cent. below par, the navigation ultimately redeemed itself and developed into one of the most remunerative and popular of traffic industries. Originally, the joint stock was declared to consist of 1500 shares of £100 each—the estimate of the cost of the canal amounting to £150,000—but in 1799, in consequence of an arrangement with Pitt, an Act was passed accumulating the whole principal sums and interest due to the proprietors into a capital of £421,525, and this amount divided by 1297, the number of the shares of stock, made each share £325 on which a dividend of 10 per cent. was paid at Martinmas of the following year, the Company having previously paid off a debt of £70,000 which they had borrowed in virtue of one of their Acts. For this year (1800), the revenue was £21,607 6s 8d ; and the total expenditure £9,497 6s 5d. In 1814, when the revenue amounted to £51,071 8s 10d, and the expenditure to £16,791 9s 8d, the Company made a dividend of £15 ; in 1815, it was increased to £20 ; and in 1816, to £25. Prior to 1808, they had two track boats on the canal which were run three times a week carrying passengers and goods. The tonnage dues from sea to sea were 5s 10d ; from Grangemouth to Glasgow, 3s 10d ; and from Bowling Bay to Glasgow, 2s. But this system was

found both inconvenient and tedious—a trip taking up a whole day—and in 1808, the Company placed on the canal 3 elegant boats for passengers alone, *i.e.*—the *Margaret*, *Charlotte*, and *Star*. These boats were drawn by two horses, and left Port Dundas and Lock 16 every lawful day. The passage of 25 miles was performed in $5\frac{1}{2}$ hours, and was divided, westwards, into the following stages:—Castlecary, Auchinstary, Sherva, Kirkintilloch, Cadder, and Port Dundas. The cabin fare was 4s, and the steerage, 2s. Not much more than a generation has elapsed since this passage to the East of Scotland was a formidable rival to the old stage-coach, and at a still later date worked in opposition to the old Edinburgh and Glasgow Railway, now the western section of the North British. To make a long story short, the Forth and Clyde Canal Company had a splendid spell of success; and since the canal has been managed by the Caledonian Railway Co. the shareholders have received a yearly dividend of $6\frac{1}{2}$ per cent. The Edinburgh and Glasgow Railway project was bound to hurt the old route, and the result is that the Union Canal between Falkirk and Edinburgh has now no passenger and very little goods traffic. But the Forth and Clyde Canal has not fared so badly. It continues to have a profitable trade in goods, and can still boast of a passenger steamer doing a fair amount of business daily.

Those who remember when six passenger boats plied daily on the canal with refreshments and a library on board to break the monotony of the weary journey from Glasgow to the East and *vice versa*—when horses with their red-coated and cocked-hat riders did the duty of steam—would now heave a sigh for the “good old days,” on seeing what remains of the old ocean highway traffic between the two

great Scotch cities. The boat which now cultivates a portion of the route, though provided with steam-power, is but a shadow of the past. Its customers are of a different stamp; its business relations are of a petty description; and but for a few towns along the valley of the Kelvin, which are still badly provided with railway communication, its occupation would be gone. The Canal Company early realised their position as a passenger-carrying company; and as far back as twenty-four years ago, instead of pushing their opposition to an extremity with the old Edinburgh and Glasgow Railway Company, they leased their interest in that department to Messrs A. & J. Taylor, who supplied the wants of the various districts between Port-Dundas and Lock 16 with one boat, manned by a couple of pairs of horses. Sixteen years ago, the Messrs Taylor introduced steam-power, and the "screw" which was then launched still does duty on the canal. It is now owned by a genuine type of the old Scotchman, Mr George Aitken, a late servant of the Canal Company; and though the tiny steamer is not a fortune-making concern, it has been found useful to many little villages, and has afforded an ordinary income to the proprietor. The vessel is 8 tons register or 12 tons gross, is worked by an engine of 12 horse-power, and carries 86 passengers—26 cabin and 60 steerage.

Though sixteen years of age, the *Swifter*, as its patrons call it, is still good in hull and equipment. During the first five days of the week it plies between Castlecary and Port-Dundas; and on Saturdays it goes as far as Lock 16. It is seen to best advantage on a summer Saturday afternoon; and if one takes a cabin passage, which is not much dearer than a steerage one, he is within talking distance of the old skipper, who finds leisure at intervals to crack jokes and

point out the beauties of the scenery to be seen along the route.

The *Swifter* is the last link in the history of passenger traffic on the Forth and Clyde and Union Canals, a route at one time so serviceable ; and it is now feared that the Kelvin Valley Railway, at present in course of construction, will completely absorb the old system. In these times of precious hours, the more speedy means of conveyance is likely to gain the victory.

Within Bowling Basin, which has an area of $9\frac{1}{4}$ acres, the greater bulk of the river steamers are laid up for the winter. To this haven also fly, in the event of a storm, all the small craft of the channel. Between Erskine and here, a distance of about $1\frac{1}{2}$ miles, the Trustees have before them a work of some magnitude. A bend, which is the cause of a strong—in fact, almost ungovernable—run of tide into Bowling Bay, requires to be cut off for the equalisation of the current. And with this undertaking there must be the filling up of the whole of the adjoining lands, unless the several beacons are to be replaced. For situation, the little village is second to none in the shire. With rich surroundings of rock and wood, it lies facing the south and the summer stir of the river, truly enviable in rural purity of atmosphere and peace. But where is Frisky Hall and its fine old orchard—a popular resort in days bygone of certain convivial clubs? The railway station ground occupies the site of the garden, and the dwelling-houses therewith connected are part and parcel of the good old inn. About 100 yards below Dunlop Castle, the width of the 2-fathom channel is 332 feet. On the highest point of the above rock, which overlooks the river, an obelisk was erected in 1839 to the memory of Henry Bell—a man whose genius certainly deserved some permanent mark of

public honour, and whose engineering enterprise for the national good was apparently appreciated. After his death, the widow had the continuance of a competent pension which was allowed Bell by the Clyde Trustees; while a full-length portrait of him hangs in their hall, Robertson Street.

Although no traces of the ditch or wall connected with the Antonine Barrier can be discerned westward of the village of Old Kilpatrick, there can be no doubt but the Romans had a port at Dunglas. This ancient castle—*Torr-lia*, *i.e.*, the grey fortress—is supposed to have been built by one of the original Colquhouns, in 1380, from the stones of a much older fortalice in the interior, which had been a stronghold of the Kilpatricks before the grant of the lands of Colquhoun to Umfridus by the Lennox Earl. From their position on a rocky promontory by the brink of the river, the picturesque and ivy-clad ruins of the castle form a striking and interesting object in the landscape; but they show little of its original character and proportions. Its walls are said to have been very massive; while a battery for arrows fronted the Clyde, from which these deadly missiles could be discharged with great effect. According to Whitelock, the structure was blown up in 1640 by an English boy, page to the Earl of Haddington, who, together with a number of people of rank, was entombed in its ruins; but be that as it may, the ancient fortalice was allowed to be materially demolished by a party of Vandals, who, with the most sordid spirit, carted off large quantities of its stones for the erection of dykes and other farm buildings. Such iconoclastic conduct towards our historical monuments is thoroughly shameful, and greatly to be regretted. Had we not “Arthur’s Oven” removed by a Bruce for the repair of a dam on the Carron; the Stone of Odin broken to pieces by an Orkney farmer for the improve-

ment of his byre; and the fine old Norman castle of Dundaff demolished by a Duke so that stones might be economically and conveniently got for the erection of the house and offices belonging to Dundaff Farm? With respect to Dunglas, however, Mr Buchanan of Auchentorlie, its present proprietor, has seen to its certain protection from further Vandalic outrage.

Dumbarton is specially interesting—the most important by far of all the river stations from Glasgow downwards. With a growing and vigorous shipbuilding trade, it presently occupies no mean position in the marine roll of the Clyde. And Dumbarton was the place first thought of by the merchants of Glasgow as the most suitable point for their harbour. Such a grant, however, was peremptorily refused by the Council of the Royal burgh, on the plea that “the influx of mariners would tend to raise the price of butter and eggs to the inhabitants.” Let us look homewards, was their motto; nor could they be induced to take a more liberal view of matters. And their footing was firm. Extensive privileges had been conferred upon Dumbarton by Alexander II., and other succeeding sovereigns. One charter gave its burgesses “the right of levying dues on all foreign vessels entering the Clyde, and entitled them to demand that every vessel coming within their limits should break bulk at the quay, and give the inhabitants the first offer of their merchandise.” By a contract, however, which was confirmed by Act of Parliament, in 1701, “the Dumbarton authorities, in consideration of having received 4500 merks Scots, gave up the right of levying the aforesaid dues—the contractors mutually agreeing that vessels belonging to the inhabitants of Glasgow and Port-Glasgow should not pay dues at the harbour of Dumbarton; and, on the other

hand, that vessels belonging to burgesses of Dumbarton should have an equal exemption at the harbours of Glasgow and Port-Glasgow." Dumbarton steamers and vessels, to this day, have the benefits of the Broomielaw free of duty. Here, there is a graving dock, but a private one, the property of Messrs M'Millan & Son. Its dimensions are:—Length within gates, or caisson, 300 feet; width at entrance, 41 feet; depth of water on 2 inch blocks at ordinary spring tides, 13 feet; at neap tides, 10 feet; and at low water, about 5 feet.

The chief object of interest at this point is the Castle (Alcluyd or Dunbritani), at one time the principal stronghold of the little kingdom of Strathclyde Britons, the Balclutha of Ossian, and the rock from which Queen Mary took shipping when in early minority she was obliged to flee to France. In the 10th century. the Strathclyde dominion became merged into Scotland. The old fortress has its museum or armoury, too, where, amongst other wonderful weapons of war, Wallace's two-handed sword is to be seen. Dr Meyrick has certainly questioned the genuineness of this revered specimen of ancient armour. Still, although such an expert may be able to prove it of the time of Edward IV., it does not follow that a similar sword could not have been held during the lifetime of Wallace. The view from the batteries of the basaltic crag baffles description. Sweeping and varied in its field, the scene is thoroughly entrancing, and one over which the eye never wearies. The Leven (*i.e.*, the sun-river, or sacred river) a tribute from Lochlomond, flows close by the base of the rock which measures a mile in circumference, and shoots up to a height of 206 feet.

The estuary is now at hand. But between the Leven Perch and Newark some heavy work has been done. To

save the sweep that vessels had to take in coming up the river from the latter point, the Clyde Trustees, from 1856 to 1859, constructed a new channel through Port-Glasgow bank, in the course of which they dredged 396,000 cubic yards of material, at a cost of £19,574. The outlay was enormous, but the advantages gained for the ship owners were well worth the expenditure. In May, 1871, 224 soundings were made in mid-channel, from Garmoyle Light to opposite Cardross Light, and the shallowest reading obtained gave 13 feet at low water. Yet that part of the river between Ladyburn and Newark is still the narrowest and most tortuous of the whole channel. By a recent survey, it was found 500 feet wide, and about 10 feet deep at low water. Here, in fact, a thoroughly equipped dredging plant could be well engaged for a term of years. Take, for example, the Cockle and Greenock banks, which are ever on the rise—the effects, it is said, of the flood tide passing rather to the northward, and of the ebb tide having a tendency to keep to the southward. But whatever the cause of these barriers to a free navigation, the time will come, and that quickly, when their removal will be imperative. No dredging is required beyond the tail of the Greenock bank seawards; but in their deepening work for the Cumbrae Light Trust, between Newark Castle and Greenock, the Clyde Trustees during the last ten years have dredged over 650,000 cubic yards and lifted 120 tons of boulders. These are large figures. And what has been the general result? Vessels over 400 feet in length, and exceeding 2000 tons net register, can now, with the assistance of steam-tugs, be navigated from the sea to the harbour of Glasgow.

THE ROMAN WALL.

WE do not go far out of the way by giving a chapter to this once important rampart which formed the northern boundary of the Roman Empire. First marked out in the year 81 by Julius Agricola, who, from his genius, energy, and wisdom was intrusted with the unlimited command of the forces in the invasion of Caledonia, it was completed in the reign of Antoninus Pius by the General, Lollius Urbicus. Unlike the wall of Hadrian, which was constructed throughout of solid stone, this barrier was a mere earthen one—more of the character of a great outwork than of a permanent frontier. What Agricola did for the line of defence, was the formation of a row or chain of forts running from the Firth of Clyde to the Firth of Forth, and these certainly formed the germ of Graham's Dyke, or Greim's Doig—"the strong entrenchment." Lollius Urbicus, however, to strengthen the bulwark, utilised the gaps between the forts by constructing a huge ditch the whole length of the isthmus, and also built several new stations, so that there might be a fort every two miles. With the earth got from the military trench, which was 27 miles long, 40 feet broad, and 20 feet in depth, a rampart, 20 feet high and 24 feet thick, strengthened with stones and turf, was raised close along the south or Roman side all the way, having a plat-

form for the soldiers ; while to the immediate south of the whole was a military causeway, 20 feet broad, and well compacted with stones, those in the centre being everywhere large and coarse, and those adjoining the ditch small and altogether fine in quality. The legions which, assisted by the auxiliary cohorts, constructed the barrier, were the Second, the favourite of Octavius Cæsar, and called Augusta, with the symbol of a sea-goat; the Sixth, named the Vanquisher, with eagles' heads curiously executed ; and the Twentieth (Agricola's old corps), known as the Valiant and Victorious, with the emblem of a wild boar. Each legion had a certain section of work assigned to it, generally a stretch of three Roman miles ; and the soldiers, as we shall see in the course of our survey of the wall, were accustomed to erect at the end of their respective stations slabs with inscriptions recording the number and title of the legion to which they belonged, and the quantity of work executed. Most of these slabs are dedicated to the reigning Emperor, Antoninus Pius, who was a great favourite with the soldiery.

Chapelhill, which lies a short distance west from the village of Old Kilpatrick, was, without doubt, the western extremity of the wall. In 1693, two tabular stones were found here, and from the inscriptions they bear appear to have been erected by the sixth and twentieth legions of the army, to commemorate the barrier, and to perpetuate the memory of the Emperor Antoninus Pius. On one of the stones is a figure of Victory, with a laurel wreath upon her brow and an olive branch in her hand. Several earthen vases and coins have also been got at Chapelhill. From the discovery of certain legionary stones, a fort, it is thought, must have stood near the church of Old Kilpatrick. Pro-

ceeding eastward, the first faint traces of the ditch are observed after crossing Sandyford Burn. These, however, soon disappear, and are not again visible until the fosse approaches the village of Duntocher, where it had certainly fallen in with the north rampart of the encampment, situated on a hill of moderate height which overlooks the district. Towards the west end of this station, some vestiges of a prætorium or other building could be seen about eighty years ago; but these are now entirely obliterated. At the foot of the hill there is a bridge which has evidently been built of stones taken from the neighbouring fort. The military way, having ascended this hill in a sweep, passes over the south side of the station, the centre of which is distant from Old Kilpatrick 3570 yards. Many interesting relics have from time to time been discovered in this locality. In 1812, a legionary stone was found, bearing the following inscription:—

L E G
I I
A V G. F
P I I I I C X I

or, as it may be translated, “The Second Legion Augusta executed 4111 paces.” Some curious subterranean chambers were also disclosed in the vicinity of the fort in 1775. In one of these an earthen jar was got, with a female figure formed of reddish clay, and a few grains of wheat.

From Duntocher the wall can readily be followed along some slightly elevated ground to a rivulet called the Close Burn, which it crosses; and then, passing over Hutchison Hill, it descends to the Peel Glen. It is said that a small castellum was established here for the security of the gorge. But no traces of such a building can now be discovered.

Leaving the glen, the ditch rises boldly to the summit of Castlehill, upon which the next fort was situated. This station, though small, occupies a thoroughly commanding position, and presents a most magnificent prospect. The Campsie range is seen from the peak of Dungoyne to Kilsyth, and the valley of the Clyde from Tintoc to Dumbuck. A belt of trees has been planted around the site of the encampment, faint outlines of which are still traceable. Two sculptured slabs have been got at Castlehill. The first had a number of figures carved upon it, emblematic of a Roman victory over our "rude forefathers." Three natives were seated on the ground as prisoners with their hands tied behind their backs, and guarded by a cavalry soldier, armed with shield and spear, ready to pursue should an attempt be made to escape; while the Imperial eagle appeared above all, half-triumphant, half-defiant. These wild men of the north were naked. One wore a strange-looking cap or bonnet, and all had beards. The expression of the faces was very grim and determined. There was also an inscription referring to the completion of a certain portion of the wall, which has been thus translated :—

"To the Emperor Cæsar Titais Aelius
Hadrianus Antoninus
Augustus Pius, father of his country.
The Second Legion, Augusta,
(Dedicate this, having executed)
4,666 paces."

The second stone found was a votive table dedicated "to the eternal field deities of Britain." From Duntocher fort to that of Castlehill the distance is 3540 yards.

Inclining now to the south-east to gain the rising grounds of Ledeamrough, the wall thereafter descends by the Thorn-

tree to New Kilpatrick. Here—2450 yards from Castlehill—stood one of the largest of the wall forts, although its site was lower than any elsewhere met with. Of this fort, the author of “The Lennox,” says:—“Its site was low, without any natural defence, and opposite a gorge. The country immediately to the eastward was also difficult to defend, especially where the river Kelvin intersected the line of wall. The Kilpatrick Fort was therefore made large, capable of holding a full cohort, and was protected by triple rows of ramparts and ditches. The hamlet of Kilpatrick and many of the adjoining field dykes were built from the ruins. About two years ago the last vestiges of this ancient stronghold, fraught with many interesting historical associations, were ruthlessly removed to make room for a cluster of villas, with the uncouth appellation of ‘Bearsden.’ Pity that some other name had not been given to the site of this ancient place of arms, such as Chesters (a stronghold), Chesterfield, Campstead, Caerleon (camp of the Legion), Romantown, Fortview, Legionville, &c. Perhaps it is not yet too late to do this, either to the whole area or to the villas, and thereby hand down to posterity the precise spot where this great Roman fort stood, when all around was barbarian. But, even failing this, could not a small tablet be put up, with an inscription, thus:—‘Here the Romans had one of their principal forts on the wall of Antoninus Pius. When the villas at Bearsden were erected in 1872, within the area of this fort, the last traces of it were obliterated. This tablet is intended to mark the site.’” Sculptured stones, fragments of pottery, ancient coins, and other Roman relics have been frequently found in this vicinity.

Nothing more of the vallum is visible until Ferguston farm and Kilmardinny are reached, where both rampart and

parapet may still be traced for a short distance. About six months ago, a large bronze ear-ring was found here. The relic which, in its time, may have dangled from the ear of a lady of some distinguished Roman officer, consisted of two rings looped together; the larger measuring $1\frac{3}{4}$ inches in diameter, and the smaller about one inch. In the descent towards Millochan, vestiges even of the wall totally disappear. It must, however, have gone along the height northward of Hillend, and therefore through the east part of Summerston, so as to fall in with the north-west angle of the fort of Bemulie, situated on the opposite bank of the Kelvin. This station, which is now the site of a comfortable farm-house, was one of the most extensive connected with the wall. Notwithstanding its size and the number of its envelopes, all traces of its foundations are, however, now obliterated. Its distance from New Kilpatrick is about 4600 yards. Various fragments of Roman art, such as inscription, legionary, and altar stones, have of late been discovered in this vicinity. In 1848, a circular building was disclosed containing charred wheat, coins, &c. But the most important of the relics found was a mutilated tablet dug from the soil in 1695, which proved the authenticity of the old historian, Julius Capitolinus, who, in his life of the august monarch, Antoninus Pius, refers to the erection of the Caledonian wall by Lollius Urbicus. The rude stone, measuring 17 inches by 10, bore the following inscription:—

P. LEG. II. A.

Q. LOLLIO. VR.

LEG. AVG. PR. PR.

Signs of the ditch again appear within the estate of Cadder. Having crossed a brook, it issued from these grounds near a fine rectangular castellum. In 1851, the military way

here was rooted out for about 300 yards. From thence the wall runs along the top of the bank, which overlooks the valley of the Kelvin, towards Kirkintilloch, where it passed to the southward of the "Peel." *Caer-pen-tilloch*, which, in the Cambro-British, signifies the fort on the head or end of a hill, was constituted a Burgh of Barony about 1170 by William, King of Scots, in favour of William Cumin, Baron of Lenzie and Lord of Cumbernauld. The "Peel," which was the only fort erected to the north of the wall, must, from the depth of its ditch, have been one of the strongest of the strongholds belonging to the defensive work. Its fortifications were, undoubtedly, of extraordinary weight. All vestiges of the building have now disappeared, but the fosse still remains to show its extent and form. It is of an oblong quadrangular shape, measuring 90 yards in length by 80 in breadth. A vast earthen rampart, from 40 to 50 feet in thickness, originally surmounted the present level platform on all sides, having in front the ditch or moat, which was not less than 30 feet in width, with a corresponding depth. About sixty years ago a legionary stone, measuring 5 feet in length by about $2\frac{1}{2}$ in breadth, was got in this locality. Carvings of eagles' heads, &c., appear at each end of the tablet, and the following inscription in the centre:—

"IMPERATORI CÆSARI TITO AELOI HADRIANO,
ANTONINO AUGUSTO PIO PATRO PATRIÆ,
VEXILLATIO LEGIONIS SEXTÆ VICTRICIS,
PERFECIT PER MILLE PASSUS."

Another stone, with bulls' heads sculptured in bold relief; a large bar of lead, marked with Roman characters, now, however, illegible; coins of Domitian, Antoninus Pius, Commodus, and Constantine, have also been discovered here.

Vestiges of the "bulwark" again appear at the east end of Kirkintilloch, following the course of the bank above the Kelvin. They disappear, however, on approaching Auchindavy Fort, which is about 2970 yards distant from the Peel. This station, through which the military way, or a branch of it, passed, had originally been covered with three envelopes; and in May, 1771, five altars, a broken statue, and two iron hammers, were found at a depth of nine feet immediately outside its south-west angle. The altars hitherto discovered along the line of the wall have invariably been dedicated to some deity of Roman mythology—to Jupiter, Minerva, Mars, and Hercules; to Mercury, the patron of highways and messenger of Jove; to Fortuna and Victory; to the Nymphs, and to the god of the woods; and four of those got at Auchindavy—still to be seen in the College Museum—are inscribed by Marcus Cocceius Firmus, a centurion of the second legion. Having passed a small rivulet, the wall continues along the rising ground by Skerry dike; thence crossing Skerry brook, it touches Twacher, where its vestiges, as well as those of the military way, once more become conspicuous. It now ascends Barhill, on the lower summit of which, towards the south-west, the next station was situated, distant from Auchindavy 3450 yards. Barhill, standing near the middle of the Isthmus, and being considerably elevated above the plains below—the highest ground, in fact, of the line—commands a most extensive view, laying before the eye both Forth and Clyde. The fort, which occupied a square area of 150 yards, was probably one of those previously erected by Agricola. It is surrounded with double ramparts, and its foundations, demolished in 1809, were exceptionally numerous. Several of its vaults were still entire in 1792. They were covered

above with flat bricks; while the flooring consisted of a mixture of lime and black and white gravel. Both inscription stones and coins have been got here. Descending the north side of the easternmost summit of the Barhill, the ditch runs along the lower grounds to Croy Hill, where there has been another fort at a distance of 3200 yards. Here the fosse has been dug out of the hard rock till it comes to the summit, when Scotch "whunstane," as has been remarked, seems to have been more than a match for Roman skill and Roman tools. A centurial stone was found here, inscribed Leg. VI.V.I.C.R F. Two similar relics were also discovered at Craigend, along with the upper portion of a small altar. Proceeding in its course from Croy Hill, some faint and imperfect remains of the rampart appear near Easter Dullatur. On the high ground to the south of this point may be seen an ancient Roman *ara* or altar—the Carrick-stone—which has been carried backward from the wall, and set up on the road side. Tradition says that on this height Bruce, marching from Carrick, in Ayrshire, rested his army on his way to Bannockburn, and on this ancient stone fixed his standard. A feeling of reverence seems to have long clung to it, on account of it having been, at one time, used as a resting-place, where the coffins of the dead were placed while being conveyed to the "Auld Aisle," formerly the common graveyard of the then united parishes of Cumbernauld and Kirkintilloch, or Easter and Wester Lenzie.

A short distance beyond Dullatur, the ditch and wall are intersected by the Edinburgh and Glasgow Railway. But we are now at the station of Westerwood which is distant from Croy Hill, 3080 yards. This fort was of a comparatively insignificant character, and was enclosed within a single rampart and ditch. On the farm of Arniebog, the barrier is

very clearly marked. Working one day in his potato field, the farmer here found some boulders interfere with his labour, and set to work to dig them out. A number of rough stones were thus brought to light. Among them a beautifully sculptured stone was turned up, bearing the image of the Emperor of the world represented as Neptune riding on the back of a dolphin brandishing his trident, and striking terror with the head of Medusa depicted upon the ægis on his breast. A day or two previous, one of the daughters also turned over a large stone, which had been loosened by the plough, for the purpose of getting it lifted into the cart, when she discovered something upon its under surface which excited her curiosity. After scraping away the adhering earth, and seeing the sculpture, she cried out to her father—"Oh, dear me, but I have found a man." The stone, on being removed to the farm and cleaned, proved to be part of an ancient altar slab, on which was beautifully and most artistically sculptured in *alto rilievo*, within a square moulding, the nude figure of a Caledonian hero in captivity, bending on one knee in a suppliant attitude, with his hands tied behind his back. The figure was perfect, and every joint and sinew fully and distinctly brought out. The part of the slab found was the lower left portion, and measured about fifteen inches square. The sculptured figure was about ten inches in height from the lower moulding, upon which the knee rests, and from the foot to the other knee of the figure about $3\frac{1}{2}$ inches. There was a cable pattern moulding above the figure, sloping towards the right; but no lettering or inscription of any kind. The stone was, in all probability, a portion of an altar erected to Victory, to commemorate some conflict or skirmish between the Roman soldiers employed on the wall, and some of the Caledonian

tribes from the north of the valley. Not far from the same spot, but on the causeway, the neighbouring farmer, about ten years ago, found a silver coin of the Emperor Hadrian.

A mile eastward, and distant from Westerwood 3320 yards, lies Castlecary (*castella cara*—the beloved castle), the *Curia Damniorum* of Ptolemy. The ditch, which is in a very perfect condition here, crosses the Red burn and falls in with the north side of the fort. This station has been one of great interest and advantage to the antiquary. Rarely have excavations been made within its boundaries but relics of special significance have been got. In 1769, an elegant plan of a house in the style of Palladio, with a *sudorium* or warm bath belonging to it, was discovered in the south angle of the then ruinous building. Two years later, when a body of workmen were quarrying stones out of the old camp-ground for the walls of the neighbouring canal, various interesting materials were also unearthed. Among these were fragments of urns and vases, portions of Samian ware, bronze ornaments, spear heads, helmets, and shields, together with a silver denarius of Hadrian and of Cæsar Augustus. In a large hollow of the rock they likewise discovered about a hundred quarters of black wheat, and which was charred, moreover, to the core. Some century and a half ago an altar was also found here, bearing the following inscription:—*“Matribus milites legionis vicesimæ Sextæ Brittonorum veteranorum sacram labenter posuerunt monumentum.”* Gordon, too, saw a broken altar with the letters *“H B A T”*—*Hors Batavorum*; and another more entire, on which was inscribed, *“Milites Vexillatio III.”* A fourth was got more recently in a briar-choked thicket adjoining the Roman barrier, and which gave good evidence of having been dedicated to *Sylvanus*, the god of the woods. About the same period,

a common slab was likewise picked up at the spot referred to, on which was a representation of a Roman archer playing havoc with a herd of deer.

Not a stone of the fort is now to be seen above ground. Its walls are utterly levelled, and its foundations grass-grown and buried beneath several inches of soil. Pity that such national heirlooms had not been placed under proper protection. Within the last twenty-five years, in fact, a considerable portion of the Castellum walls has been wilfully razed, and the historical stones carted away for the purposes of steadying-buildings and dykes. It might be a difficult task, however, to convince the keen matter-of-fact farmer that such grasping demolition of these real antiquities is something akin to a criminal misdemeanour.

From Castlecary, the wall still runs along the slope of commanding ground, having the Bonny Water in front. Clear of Seabog Wood, it passes on to Chapel Hill, where a small castellum stood on the north side of the ditch. According to tradition, it was between this point and the site of an old watch-tower near Elf Hill that Græme, with his Britons, broke through the military curtain. Beyond Round-tree Burn we find Rough Castle, which is surrounded with a wall and double ditch of large extent. In 1843, a stone bearing an inscription and hieroglyphics was found in the property contiguous.

From Tamfour Hill issued the Roman way leading to the station and town of Camelon. At one time the sea seems to have washed the slopes of this platform, giving to old Camelon the character of a seaport where vessels might land provisions for the Tungrian soldiers stationed on the wall. Sir Robert Sibbald, writing in the early part of last century, speaks of an anchor and Roman coins which had been dis-

covered on its site, and describes the vestiges of regular streets with vaults underneath. But here we do not require to go back so far for such antiquarian curiosities. A comparatively recent period afforded a rich supply of coins, including an alabaster vase or tazza, the neck of a wine-jar, and several sorts of iron instruments. These were disclosed by the cutting of the Polmont Junction railway in 1851 which exposed a drain of remarkable size, built of squared blocks of freestone, and covered with slabs of the same material. This drain has long provoked the wish of many an antiquary for a thorough exploration of its contents. The energy of a neighbouring gentleman, Mr Wilson of Banknock, has gone so far to satisfy this desire. About nine years ago, he, with a band of willing workmen, devoted two days to the task of excavation, in which he met with ready co-operation from Mr Ralph Stark, the farmer of the ground. Penetrating as far as was practicable on each side of the railway cutting, they reached strong foundations of walls, two on the south and one on the north side of the railway. The points on which they struck were the corners of the buildings, which were found to rest on a pavement of flagstones bedded in clay. Above these walls, and all around, was an accumulated mass of *debris* of ruined buildings, through which were dispersed bones of the ox, sheep, pig, and deer, fragments of pottery (some of which were of Samian ware), handles of amphoræ—on one of which were distinct letters—many bricks, and bits of tile flues. A circular disc of bronze about the size of a florin, attached to a nail, was found in one of the buildings, as also the shell of an oyster, and considerable quantities of charred wood. On a large square brick was the impression of a dog's foot, a circumstance which has been noticed in Roman bricks found near

Hexham, and in the buried city of Uriconium, near Shrewsbury.

Leaving Glenfuir by North Bantaskine, the wall crosses the Arnothill, and enters the gardens on the south side of the town of Falkirk, where a fort of considerable dimensions once stood. About the beginning of the present century, an immense quantity of stones were dug from two of these gardens, with which several walls were built in the neighbourhood. Fire-places were also discovered still bearing blackened stains of their former servitude; while amid heaps of rubbish were found a number of fire-seared vessels, of a clayey compost and of grayish colour, about an inch thick, and upwards of a foot broad. There was likewise a vessel of remarkably beautiful workmanship, about the size and shape of a common slop-dish. The material was very hard, and resembled red sealing wax. It bore on the outside the figures of four lions, and other hieroglyphics, with the word *NOCTURNA*. On one of the stones dug up, the word *FECIT* was distinctly traced. In another garden a fine coin was found, having on the obverse the bust of Antoninus, with the legend *Antoninus Avg. Pivs. P. P.* So the present has grown up upon the ashes of the past.

Beyond Falkirk, the first vestiges of the fosse again seen are in the grounds of Callendar. Here it crosses the chief avenue of the estate, and shows the same basin-boldness of character as it does in the neighbourhood of Glenfuir and Bantaskine House. Having passed a small brook, it proceeds direct into Laurieston, where, when the canal was being cut, a Roman granary, or cell, was discovered, in which was a large quantity of blackish coloured wheat. In a field nearly opposite the "Kennel," there stood, until somewhere about the beginning of the present century, the

remains of an old castellated building, which was supposed to have been intimately connected with the Vallum of Antoninus ; and even now the site is locally known as "Castle-towrie." From Laurieston the wall holds on by Mumrills, —the *locale* unquestionably of another station ; and here, of late years, various relics, in the shape of urns and other vessels, have been found. There was also a millstone, about 18 inches in diameter, which consisted of a dark coloured lava, like the lava of the millstones of the great quarries of Andernach on the Rhine. This was got lying on a stone that contained the epitaph of a Roman soldier. The wall next touches with some prominence at Beancross, striking through about twenty-five yards above the toll ; then crosses a neighbouring burn for a flat field of about twelve acres, leading to the north-west corner of Polmont Park Garden, where it goes boldly underneath the garden wall, and thence through the lawn eastwards to Polmont Kirk. Here it crosses the public road, traverses the property of Mill Hill, and can be traced with great ease along Windy-edge and the Hill farm-house. Within a plantation at Inneravon we meet with the ruins of an ancient tower. Its height is about 19 feet, and thickness of wall 5 feet 3 inches. In diameter it measures 13 feet 9 inches. Its first outer wall stands 90 feet from the base ; while the distance between the first and second wall is 60 feet. The building is supposed to have been a fort, as it lies on the line of the "sheugh," about 4400 yards from Laurieston. Eastward of the enclosures of Kinneil a slight vestige of the ditch is again perceived. No doubt another station stood at Kinneil House, which is about 3400 yards distant from Inneravon. On this estate the foundations of an old Roman bridge are also seen. Beyond Grange, no remains of the wall are dis-

cernible, though it is probable that the last or 19th fort stood on the height behind the Kirk of Carriden. In April, 1868, a sculptured slab was found at Bridgeness while a corner was being dug in a clearance formerly made by Mr Cadell during the erection of iron smelting furnaces. This tablet, which is of freestone, 9 feet long, 2 feet 11 inches broad, and about 9 inches thick, is perhaps the finest specimen of Roman lapidary art yet discovered in Britain. In the centre is an inscription recording the erection of so many paces of the wall of Antoninus—"To the Emperor, Cæsar Titus Olius Hardrianus Antoninus Augustus Pius, the Father of his country, the Second Legion [surnamed] Augusta, has made 4652 paces." On each side is an *alto relievo*—that on the left representing a Roman horseman riding over the vanquished Britons, and that on the right a sacrificial scene. The discovery of this legionary stone settled a matter of considerable antiquarian importance—namely, the exact terminal point of the wall on the east. The word Carriden, moreover, is derived from two British words, "Caer" and "Eden," which signify "the fort on the wing," or extremity.

So much for our brief sketch of the remains of the greatest of our national monuments—a structure which marks the epoch when Scotland was first visited by civilised man. It has been said that the security of this Roman barrier depended more upon the almost impassable swamp formed on its northern side, than upon the breadth of its ditch, or the height of its dyke. But although it now exists simply in disjointed fragments, invisible save to the prying eye of the antiquary, and is seen only to advantage hid in old woods, thick with briars, or passing through some dreary tract, over bleak hillsides, with an occasional solitary cot, enough of the ditch has been left, if the rampart and causeway have dis-

appeared, to strike one with wonder at the vastness and strength of those earthworks by which the armies of Imperial Rome sought to check the ceaseless incursions of the unsubdued Caledonians. In their mere magnitude, these *stativa* put to blush the most gigantic engineering labours of the present day. Fitting memorials are they of the combined power and skill, military instinct, and perfect organisation of the soldiers of that ancient Empire which had conquered about the whole of the then known world, and who left deep footprints wherever they trod. No doubt time and the elements have done much in hastening the decay of these grand memorials of our country's history, but the ruthless hand of man has done more. They are and should be of national interest, and some step might surely be taken to preserve the few indications which yet remain of their character and object—camps and fortifications admirably adapted for a warfare of the plain. It is to be regretted, too, that more attention has not been bestowed by some of our own antiquaries on the wall of Antoninus. Dr Bruce, of Newcastle, through great industry and research, has made us familiar with the wonders of the wall of Hadrian, but the altars, tablets, and sepulchral slabs which have rewarded the partial and imperfect investigations made of the barrier between the Clyde and Forth surpass in interest those found in the more stately wall of the south.

PORT - GLASGOW.

BRIEF as our sketch has been of the Clyde, past and present, it could not fairly be closed without some reference to two chief points at the mouth of the channel—Port-Glasgow and Greenock. Thomas Tucker, writing of the former locality in 1656, says that “Newarke is a small place where there are, besides the laird’s house of the place, some four or five houses ; but before them a prettye good roade, where all the vessels doe ride, unlaide, and send their goodes up the river to Glasgow in small boates. At this place there is a wayter constantly attending.” The castle, which stands on the eastern point of the bay, is now in ruins ; but was partly inhabited about 120 years ago. It consisted of a square court, with high walls, round turrets, and battlements. Over the main door were the arms of Maxwell, having beneath them this inscription—“The blessing of God be hereon, anno 1597.” The tower is of more ancient date than the rest of the building which was at one time the principal mansion-house of the barony of Finlaystoun Maxwell.

Shut out imperiously from the privilege of berthing at Dumbarton, the Glasgow authorities, as the next best quarters before them, at once turned their attention to the water accommodation of Port Glasgow, and in 1668 purchased from Sir Patrick Maxwell of Newark 22 acres of land for the

construction of a harbour, which, after a grant authorising the scheme had been obtained from the Crown, was commenced and executed in due course. Here, or at Greenock, the merchandise for a long series of years was discharged from the trading ships, and was ultimately conveyed to Renfrew by means of lighters. These lighters were either poled up the river, or came up with the tide, and at Renfrew were met by horses and towed to the Broomielaw. The old towing-path, 20 feet wide, is still open as a public right of way. But the mode of conveyance alluded to, which continued until 1818, when steam-tugs were introduced for the towing of the lighters from port to port, was liable to serious interruptions. During winter, it was nothing unusual for the river to be frozen up for months, and carts had then to be put on the road between Greenock, Port-Glasgow, and Glasgow, for the forwarding of goods discharged. At the beginning of the present century, the rise of the tide at Port-Glasgow varied from 7 feet to 13 feet, the ebb tide leaving a depth of about 8 feet of water. Its graving dock then, as now, was a great acquisition. Having had its origin in 1762, it was the first work of the kind constructed in Scotland, and was built from a design by James Watt. In 1805, to meet the requirements of the times, it was not only deepened with a new floor put down—the sill and floor being composed of timber—but its entrance was also slightly widened. Its length was 256 feet from centre of gates to upper end of floor; breadth at top, 70 feet; width of gateway, 33 feet; and depth of water on sill, $10\frac{1}{2}$ feet at spring tides. Latterly, however, these proportions were found totally insufficient for serving shipbuilders and shipowners in their larger class of vessels. Consequently, in 1871, the Trustees resolved to reconstruct the dock, and in January, 1875, the

new and enlarged structure was opened in presence of hundreds of spectators. It is built of freestone and gives a length of 325 feet; a width at entrance of 45 feet; and a depth on sill at springs of 15 feet; while the body of the dock is 70 feet wide at cope. The engineers, who designed and carried out the work, were Messrs Bell & Miller; and the contractors, Messrs John Coghill & Co.

The population of the Port, in 1755, was 1695; in 1798, 4036; in 1800, 3865; and is now about 10,900. A passing sight of the place is sufficient to show its trade. In front of the town, and beyond it on east and west, the shore is completely covered with timber ponds, all of which are more or less full of logs. And the shipping all but solely lies in that traffic. The only exception is an occasional cargo of sugar. In 1783, Port-Glasgow had three dockyards, and during the ten years following 51 ships of 5992 tons were built here. There are, however, six shipbuilding yards now connected with the town, from which 41 vessels of 24,097 tons were launched in 1871, and 35 of 21,062 in 1872. It was here, as we have previously said, that the *Comet* was built by Mr John Wood for Henry Bell.

In shipping, Port-Glasgow has never reached any note. Greenock lay too near it for that, and the probability is that its future development will lie with the same trade to which it is at present indebted for its prosperity and population. In 1736, it had a rope work; in 1740, a sailcloth manufactory; and in 1777, a sugar-house. The extent of its shipping, in 1778, was about 11,000 tons. In 1804, including the repeated voyages of foreign traders and coasters, it was 591 vessels, representing 58,287 tons. In 1817, however, the number of ships inwards showed a decrease of 108, and those outwards of 33—the total for that year only being 450, with

a tonnage of 60,821. "The peace that followed the war" is the reason given by Robertson for the decline.

According to the Board of Trade returns, the value of imports for Port-Glasgow in 1872 was £275,226; the total exports, £108,806; and the gross amount of Customs revenue, £10,691. In 1864, an Act of Parliament was passed fixing the limits of the harbour from Devil's Glen Burn on the west to the lands of Auchterley on the east. For deepening work, all of which is executed outside of the quays, the Trust have a dredger in stock, the material lifted being towed over in punts to the Cardross shore.

GREENOCK.

GREENOCK (Grianaig, equivalent to Granicus, a sacred river of Bithynia) which gives the title of Baron to Earl Cathcart, was, in 1641, made a burgh of barony ; and in 1751 it obtained its charter. Throughout the 17th and 18th centuries, its trade was principally that of herring fishing, and the traffic, home and foreign, from this farming of the sea must have been somewhat considerable. As early as 1680, for example, the town possessed no fewer than 900 fishing-boats, with a full complement of nets. Tucker, in 1656, speaks of Greenock as “such another place as Newarke. only the inhabitants are more, but all seamen or fishermen, trading for Irelande in open boates, at which place there is a mole or peere, where vessels in stresse of weather may ride and shelter themselves before they pass up to Newarke,” We learn from another source that, in 1604, the whole town consisted of a single row of thatched huts at the Rue-end—the first feu having been granted in 1636, at the foot of the Broomy Brae, afterwards called Tanwork Close—and it was only in 1670 that it got a fair start for development, when the Royal Company was formed for the curing of herring—Charles II. being one of the shareholders. For the object thus contemplated, a large tenement was erected, which afforded accommodation both for the preservation of salt

and the storing of stock until exported. This building, however, was brought to the hammer in 1684, and was purchased by the Magistrates and Town Council of Glasgow. But the trade proved profitable. The herring caught in the Clyde had the fame of being larger, firmer, and taking better with salt than any others in the kingdom.

The construction of the first harbour at Greenock was commenced in 1707, and completed in 1710. Its cost was about £5600, the money having been advanced by Sir John Shaw, on security of a voluntary assessment of 1s 4d on every sack of malt brewed into ale within the limits of the burgh. In 1740, the loan was in full refunded; and so steadily had the wealth of the port increased year after year, that after wiping off this £5600, the town had a surplus on hand of £1500.

All through, the aim of Greenock has been, so far as funds and borrowing powers would allow, to make the port worthy of its traffic, and to offer every encouragement for a still more extensive trade. But the Trust have, of late years, shown special enterprise in the extension of harbour facilities. From 1836 to 1870 they expended £2,210,000 in harbour and river works; while from 1773 to 1836 a sum of £1,134,000 was similarly spent. And with what results? The total quayage here is now 5455 yards. The length of the river frontage is 4960 feet; the quayage of Victoria Harbour, 2000 feet; of East Harbour, 2750 feet; of West Harbour, 3440 feet; of Albert Harbour, 2875 feet; and of Prince's Pier, 340 feet. Another, and the latest example of the Trust enterprise was their movement for a 70 and 100 ton crane. One of 50 tons might be thought quite sufficient for the heaviest lifts of present boilers and engines, seeing that the former, which are made in separate parts, rarely, if ever,

exceed 40 tons in weight, and that an engine, even of 300 horse-power, seldom has a crane lift of 30 tons. But the Trust have evidently in mind that the heavier class of machinery not unfrequently requires to be cast piece-meal to suit the crane-power at command, and also that some provision should be made for jerks, which are unavoidable even with the greatest care. The revenue has evidently kept pace with the extension of the works. In 1783 it was £111 4s 8d; in 1829, it amounted to £11,243 15s 4d; in 1836, to £11,037; in 1841, to £14,696; in 1861, to £25,000; in 1869, to £47,676; and in 1871, to £51,552. From the Board of Trade Returns, we find that the value of imports for Greenock in 1872 amounted to £6,979,746; and the total exports to £861,065. The Custom House, which was erected in 1818 at a cost of £30,000, is a handsome building of the Grecian Doric order. Some idea of the progressive rise of the trade of the Clyde will be conveyed by the following note of the gross receipt of Customs at this port:—In 1728, it was £15,231; in 1801, £180,341; in 1828, £455,597; while in 1872 the Revenue exceeded that of any other Scottish port, having reached the sum of £972,228. Greenock, however, in 1710 was possessed of a Custom House, although subordinate to that of Port-Glasgow; and in 1719 the merchants sent their first ship to the American colonies. The present debt of the Trust is £646,742, being about £100,000 under the amount of their borrowing powers.

Cartsdyke, or Crawforddsdyke, an ancient town which was erected into a burgh of barony by Charles II. in 1669, was felt for many years by Greenock as a stiff rival. The two, however, have now got wed—Cartsdyke forming what may be strictly called the east end of Greenock—so that there is an end between them of competitive strife. It was in the

harbour of the former town, as may be remembered, that the unfortunate expedition to Darien was fitted up.

Here, shipbuilding is still prosperous. As early as 1791 the largest vessel which had, up to that time, been built in Scotland was launched from Mr Scott's yard—a ship of 850 tons. At present there are three building firms in the port, and by these there were launched, in 1871, 10 sailing vessels of 9289 tons, and six steamers of 18,400 tons; in 1872, three sailing vessels of 8260 tons, and five screw steamers of 15,700 tons. Mr Peter Love was the first in Greenock to build a square-rigged vessel. This was done in 1764. Mr Walter M'Kirdy, however, built another the same year, and both vessels went to the West Indies. The first vessel—also square-rigged—built in Scotland for the East India trade was the *Bengal*, launched in February, 1815. Her builders were Messrs Steele & Carswell, who began business at the Bay of Quick in 1796. Messrs Wm. Simons & Co. started in 1817 with the brig *Christiana*. In April, 1826, Messrs Robert Steele & Co. launched the *United Kingdom*, which, till that time, was the largest and finest steam vessel that had been built in this country.

A large trade is also done in sugar refining, and other more common industries. The first sugar-house was erected in 1765 by Mr Mark Kuhl, for a company of Greenock and Glasgow men. The second was built in 1788, the partners being all of Greenock; the third in 1802, by Messrs Robert Macfie & Sons; the fourth in 1809, by Messrs Jas. Fairrie & Co.; the fifth in 1812, by Messrs Wm. Leitch & Co.; the sixth in 1826, by Messrs Angus Balderston & Co.; and a seventh in 1829, by Messrs Tasker, Young & Co.

The population of Greenock, in 1695, was 1700; in 1755, 3858; in 1791, 15,000; in 1801, 18,400; in 1811, 20,580; in

1821, 23,500 ; in 1830, 27,000 ; and as shown by the last census, is now about 58,000.

The great want of the harbour hitherto has been that of water depth. And this disadvantage in the otherwise spirited and thriving port has been long and sorely felt ; but the financial position of the Trustees kept them stationary in floating facilities. In 1804, the foreign traders and coasters in and out were 1881, representing 160,303 tons ; in 1817, they numbered 1606, of 160,076 tons ; and in 1830, when the outward and inward tonnage was 432,582 tons, the port had the benefit of the four graving docks—two public and two private—which it had simply in 1870, while the tonnage had increased to 2,899,339 tons. The following figures show the dimensions of the three public graving docks now at ships' service :—Length of floor of No. 1, 220 feet ; width of entrance at cope, 33 feet 6 inches ; greatest depth of water on sill at ordinary spring tides, 9 feet 9 inches ; at neap tides from 1 foot 6 inches to 2 feet lower ; and dry at low water (spring tides). Length of floor of No. 2, 350 feet ; width of entrance at cope, 38 feet ; greatest depth of water on sill at ordinary spring tides, 11 feet 8 inches ; and depth at low water (spring tides) 1 foot 8 inches. Length of floor of No. 3, 500 feet, capable of extension to 800 ; width at coping level, 80 feet, and at bottom 70 feet. The entrance is 60 feet wide at the coping, with a depth of 10 feet of water at high tide. In this dock, the largest Inman or Cunard liner can be accommodated while undergoing repairs. The Trustees, with Provost Grieve at their head, having carried the purchase of the whole of Garvel Park at a cost of £80,000, the work of excavation for the building of the dock was commenced in April, 1870 ; the foundation stone was laid on the 6th July, 1871 ; and the ship *Princess*

Royal sat down upon the blocks on the 1st April, 1874—the day of inauguration. The bores which were put down preparatory to the construction of the dock, and the extensive excavations which followed, afforded the local geologists some interesting features for study. The deposit revealed was not only rich in marine fauna, but also in its diversity of organisms. The cutting was through a slightly inclined bank of irregularly coloured boulder clay about 60 yards from the shore, and was carried to a depth of 30 feet. The longitudinal section of the dock was found to be crossed by a trough, formed in the boulder clay, 300 feet in length, 24 feet in breadth, and 14 feet in depth near the middle. Here, it may further be noted that the whole of Garvel Park lies on a bed of old red sandstone; and, in excavating the tunnels which connect the dock with the sea, a mass of this rock was encountered about 40 feet below the surface, necessitating an amount of boring and blasting that greatly hindered the execution of the work. The sides of the dock are of light-grey marble, 12 ins. thick, with a massive backing of rubble; and instead of being stepped the whole way down, rise vertically from the bottom for about 14 feet, while the remainder of the distance is made in steps 15 inches wide. The rolling caisson which is of great strength, weighing about 12 tons, renders heavy swing bridges with their attendant machinery for opening and closing unnecessary. This together with the folding bridge at the entrance is the patent of Mr Kinipple, C.E., consulting engineer to the Harbour Trustees. When vessels are entering or leaving the dock, the caisson, instead of being floated out of its berth, is carried upon trollies running upon plate rails fixed on the bottom of the chamber. When the caisson is in its place, and the dock pumped dry, the weight of the water outside presses the

caisson tightly against the teak facing and keeps the water from entering ; and if it be used as a wet dock, the water is prevented in the same way from passing out, and a uniform level maintained, no matter what the state of the tide. There is an air chamber in the caisson which can be floated and removed when repairs are requisite. The engine-house is 16 feet below the quay level. Against the walls there are gauge-glasses which show the height of the water inside and outside the dock. The total cost of the works was about £70 000.

During summer, when the coast traffic is in full swing, the Greenock quay is a sight for stir. What the Spaniards say of Seville, may be then said of Greenock—"He who has not seen it has missed a wonder." The majority of business people, and those also on pleasure bent, naturally prefer running down thus far by train and catching their boat clear of the stench and confines of the river. It is a saving of time, too—thirty minutes against ninety at the least. And with respect to passenger accommodation, Greenock might well make Glasgow blush. Commodious waiting-rooms and elegant refreshment saloons give a special comfort to the quay. And, moreover, what a feast ever awaits the eye whose *forte* is character ! Every hue, form, and temperament is here represented—the congress of nations in miniature. Tourist etching, however, lies out of our present field, and we must pass to the dry details of water matters, after simply referring to the town itself, about which, apart from its rapid advance from the obscurity of a fishing village, there is little of interest. James Watt, the inventor of the steam engine, was a native of Greenock, having been born here in 1736, and an institution, creditable to the inhabitants, has been raised in his honour. In the West Church

burial ground may also be seen the grave of Burns's "Highland Mary." Another building worthy of notice is Wood's Hospital—an asylum for the relief and comfort of aged master mariners and merchant seamen. The building, which was completed for occupation on July 19th, 1854, is finely situated on the terrace-like slope of the hill, near to Fort Matilda, overlooking Gourock—the bay of Goats. Its architecture is of the Tudor style. The hospital has a frontage of 300 feet, and is of two stories, each 13 feet high, with a bell tower rising 80 feet.

Greenock Quay—the edge of the deep-water channel of the Clyde—may be said to extend from Ladyburn to the Albert Dock. The present depth, 5 yards out, at the steamboat berths averages 14 feet at low water of ordinary spring tides; but there have been earnest efforts of late to have the harbour generally deepened. In the beginning of 1872, 53 tons of boulders were removed by the diver during a course of dredging, of which some 50 tons were taken out near the second gauntress from the east end of the quay. Yet, as it is, vessels drawing 24 feet of water can, with ease and safety, berth at Greenock. The *Imperial*, *Horne*, and *Pearl of India*, each drawing 23 feet 6 inches, are, with others of an almost equal draft, duly recorded as having arrived in the harbour; while the *Black Prince*, with a draft of 26 feet 6 inches, left here even years ago with flying colours. Much, however, requires to be done for the improvement of the out-lying channel. For the last century and a-half, no perceptible change of any sort has taken place in its sectional area; not even as regards scour. And off Garvel Point the depth at low water is only 14 feet 8 inches. The channel, too, from Albert Harbour to that Point, is both crooked and narrow. About mid-way between the Custom-house—which

was erected in 1818 at a cost of about £30,000—and Garvel, the deep water is only 215 feet wide ; while opposite the Custom-house itself it is little over 450 feet. But the port has its own interests to protect. Some time ago, there was a strong proposition to have the south-west angle of the Greenock bank dredged off, and even that it should be cut right through, so as to straighten the channel out to sea. The Trustees, however, rebelled against any such interference with the bank, on the ground that, by confining the scour of the ebb within narrow limits it gave a deep channel and a well-swept frontage. Tamper with it, and the harbour would naturally silt up ; increase the width of the channel, and you send the deep water track farther from the basin of Greenock. Thus it was that a protective clause was granted by the Committee of the House of Commons on the late Clyde Lighthouses Bill to the effect that the Lighthouse Trustees shall not have power to carry out works between Newark Castle and Cardross Burn, Whitefarland Point, and Roseneath Patch, without the consent of the Greenock Harbour Trust, or the authority of Parliament. The Harbour Trustees, of Greenock, as has been remarked, sit at the gate of the Clyde, full of watchfulness over their own interests, and jealous of the interests of Glasgow in all that concerns its navigation—unwilling that the great commercial city should get as free access to the sea as herself. But one thing is certain. If the Clyde and its ports are to prosper for the future as they have done in the past, all Trustees concerned must work hand in hand for the removal of whatever threatens the progress of the navigation. Glasgow's loss in channel obstruction can never be Greenock's gain.

And what of the Skelmorlie Bank—a dangerous shoal which lies in the main track of vessels going to sea ? There

should be no difficulty about the issues of its removal. At low water of spring tides this rock has only a covering of some 16 feet; consequently, for about three and a half hours of the ebb, and for three hours of the first flood, ships or steamers drawing, say, 20 feet (and there are many such), cannot possibly pass clear over the bank. And, as a proof that they do not at all times escape damage here, large pieces of copper have been found on the shoal—unmistakably torn from the bottom of vessels passing seawards. In the spring of 1872, a large boulder, weighing 60 tons, which lay on the bank, was removed by Mr Gush, diver, Greenock. That was unquestionably a good service done shipowners, as the highest part of the bank was right in the track frequently taken by vessels. From an examination of this bank in May, 1865, it was found that the bottom was extremely rough ground, consisting of a thin coating of coarse gravel on the surface, under which was hard till or clay, of about 3 feet deep, resting on solid rock; while the whole ground was strewn over with boulder stones—the largest being the one last removed, and which stood $5\frac{1}{2}$ feet above the average level of the adjacent bottom. What has been done by the Cumbrae Lighthouse Trustees is certainly in the right direction, and we have no doubt but eventually will follow the removal of the whole of the boulders scattered over this mischievous bank.

PIERS ON THE FIRTH.

At last, Dumbarton has been rendered as accessible by water as by land. On 8th May, 1875, a new passenger pier, which had been in course of construction at the Castle during the previous twelve months, was formally opened with considerable ceremony—a salute of 21 guns announcing the inauguration. An earlier date had been fixed for the event, but although the Town Council got a bill carried through Parliament for the erection of the pier, unexpected obstacles cropped up which greatly retarded its progress. First of all, the late Sir James Colquhoun of Luss objected to the work on the plea that it would interfere with the amenity of his salmon fishings on the Leven and Clyde, and it was only by Provost Bennett and his colleagues in office agreeing not to dredge during the months of May, June, July, and August, that their bill was not opposed in the House of Lords. It was thus the month of September before Messrs John Coghill & Co., the contractors, got thoroughly started, and from the exposed position of the site the stormy winter months were by no means favourable for pushing on operations. In 1606, we find the Chancellor of Dunfermline intimating to the King the pitiful case of the inhabitants of Dumbarton, the townsmen being unable to defend themselves against “the surges and inundations of the sea, which is likely to

destroy and tak' away their haill town, and cannot be repulsit by nae moyen their poor ability and fortunes are able to furnish." Those who were appointed to inquire into the matter reported that it would require at least 30,000 pounds Scots to make a proper bulwark. And even now Dumbarton, being the head of the estuary of the Clyde, gets a full share of the rough weather of the channel. Under the personal superintendence of Mr Buchanan (one of the firm of contractors) great progress, however, was latterly made in the carrying out of the pier work, notwithstanding an unfortunate scarcity of labourers and punts. The dredger employed in the deepening of the water-bed for a depth of 10 feet at low and 21 feet at high water was the *Success*—the property of the local Town Council. This machine, which was built by Messrs M'Millan some ten years ago, was found admirably adapted for its work. It carries 32 buckets, and is 40 horse-power. The soil lifted was, for the most part, running sand; and, contrary to general expectation, no rock luckily was encountered. In the process of deepening, upwards of 30,000 cubic yards of material were raised, and this was utilised in forming the road of approach, which, to the landward side of the pier, winds round the base of the Castle Rock, and extends to about 100 yards beyond the entrance to the Castle, forming a fine esplanade throughout its entire length. The road is 550 feet long, with an average breadth of 80 feet. The portion fronting the river has been so constructed as to resist the action of the water, and round the edge of the breastwork is placed a handsome railing five feet in height.

The pier—the plans and specifications of which were prepared by Mr Copland, C.E., Glasgow—is a wooden erection of substantial character. A gangway, which has a diagonal

fence on either side for the protection of passengers, runs 640 feet out into the river, with a breadth of 15 feet ; while the landing at its extremity is 93 feet in length by 25 feet in width. The whole work is, of course, constructed upon piles. It was a mistake, however, not to have had the pier extended an additional 60 feet seaward. Such an arrangement would not only have considerably lessened the expense of dredging, but it would have given the steamers simply a gentle sweep instead of a considerable curve out of their course. The total cost of the undertaking was about £8000, and against this expenditure a penny is charged each passenger landing on and leaving the pier.

There can be no doubt that this enterprise on the part of the municipality of Dumbarton will prove of great advantage to the town. Any of the inhabitants, for example, who required to visit Greenock, which is distant only some five miles across the firth, had either to take the rail to Helensburgh, and then the steamer from that point to the port; or, what was more customary, the train to Glasgow, and thence a run to Bridge Street Station, and down the south side of the river—a journey of at least 34 miles.

Helensburgh slip-pier was, some few years ago, a most critical point to take, especially by such a steamer as the *Dandie Dinmont*, when the storm struck stiffly from the south-west. For sailing safety at such times, Eric, the wizard of Norse legend, who shifted the winds with his cap, would have been required as captain in room even of a “Dan” or Jack MacKinlay. Its surface sloped from 6 feet above high water at the top, down to 3 feet below that level at the seaward end, where the depth at ordinary low water was only from 4 to 5 feet. At high water one-half of the pier was consequently covered. It has now, however, been

raised to a uniform height of $6\frac{1}{2}$ feet above high water, and extends 100 feet seaward, forming a return head 100 feet long across the end. Its width is 50 feet.

In the construction of Toward Pier, in 1863, various experimental piles were driven, at the instance of Mr James Lamont of Knockdow, for the purpose of testing the sort of timber that could best withstand the action of the *teredo navalis*, the *limnoria terebrans*, and other marine insects. These comprised Bethel's patent creosoted timber piles; others clad with copper, zinc, and Muntz's patent sheathing; Quebec red pine covered with wrought-iron pile nails about one inch square on head, one-eighth inch thick, and weighing about 3 lbs. per square foot of timber; larch with the bark on; greenheart and elm fenders. The result was that the elm was eaten through in about four years, or at the rate of about one inch per annum; the larch stood about seven years; the Quebec red pine, without protection, lasted for nearly the same period; while the timber creosoted remains still uninjured, together with the greenheart and the piles covered with the sheathing and nails. The Toward Pier, during its erection, was an object of some interest. The site being openly exposed to the cross seas of the firth, not a few doubted whether the building would have stability to resist their force. It has, however, braved many a gale, and still looks a durable structure. The length of its masonry approach is 85 feet; of timber bridge, 260 feet, by 16 feet broad; length of pierhead, 126 feet, and breadth, 25 feet. The plans of the pier were prepared by Messrs Robson, Forman, & M'Call, C.E., Glasgow, and carried out by Messrs J. & A. Waddell, contractors, Coatbridge.

In 1871, a substantial iron pier was erected at Carradale, on the Campbeltown passage, by Col. Buchanan. This pier,

which was the first of its kind constructed in Scotland, replaced an old wooden erection at which steamboats could call only when the weather and tides were favourable. The work, in respect of its novel materials, deserves description. The piling consists wholly of old railway rails. These, having had a large cast-iron disc or shoe attached to their under part, were sunk to the required depth solely by their own weight, the displacing of the sand being effected by means of a water-jet. The pierhead, which is 25 feet wide, consists of three rows of piles, braced and cross-braced by horizontal struts and girders, to which the fenders are fixed ; and the piles so alternate that any local strain or stroke to which the pier may be subjected is thrown over the structure generally. The gangway leading to the pierhead has a floor of 6-inch planking, and is formed by $3\frac{1}{2}$ iron arches, each span extending to 40 feet. With a certain elegance of appearance, there are thus combined economy and strength. The chief peculiarity of the pierhead is its construction in two separate floors, one being four feet lower than the other, and so arranged and connected by a ramp at the back as to afford special facilities for the loading of cattle, sheep, herring, &c.

At Brodick, with its bay two miles in length, and which is situated mid-way between the extremities of the island of Arran, another iron-pier, similar in design to the above, was erected in 1872 by the Duke of Hamilton, about 100 yards to the east of the former landing-place. Until then, there had been no pier at Brodick. Passengers and goods from the steamers were put ashore by small boats ; while cattle for shipment had to be taken to Lamlash, where there is a stone pier at which steamboats can call at high water. This iron pier has proved of great advantage not only to the lovers of the picturesque visiting Brodick, but especially so to the in-

habitants of the northern district of the island. What chiefly recommends the adoption of these iron structures is their great durability, without greater cost than similar erections in wood. Then, with the latter material serious difficulties are frequently experienced in the disposal of strains; while with iron such matters are easily overcome. Both of the piers referred to have been erected from designs by Mr Mortimer Evans, C.E., Glasgow; the contractors being Messrs John Stewart & Son, Irvine.

A third iron pier was constructed in 1872 on the Great Cumbrae, for Lord Glasgow. This island lies about four miles east of Bute, and nearly two miles west of Largs. Its length is three miles and a-half, and average breadth two miles. For feuing purposes the island certainly possesses peculiar attractions. Its surface is finely undulated, and the hills at one point rise to a height of some 500 feet. The pier, which was commenced in July, 1871, is 275 feet long and 18 feet broad, widening out at the seaward end to a T-shaped head, 80 feet by 25, for the convenience of vessels lying alongside. The structure rests on cast-iron piles screwed in some cases and driven in others (according to the stratification) from 5 to 6 feet into the ground. These are placed in pairs at a distance of 18 feet apart, and are strongly braced together transversely. On the top of each pair of supports are placed cast-iron transverse girders, on which rest wrought-iron continuous lattice girders 4 feet deep, that support the roadway, and also form the parapet to the pier. The roadway is of timber laid on rolled iron joists, which are riveted to the under-side of the main lattice girders. The piles, at the head, are of wrought-iron, seven inches diameter, in four segments, firmly riveted together at flanges; and in four cases these are carried up above the deck to form supports.

for cast-iron mooring bollards. The lattice parapet is not carried round the head, but the deck is here supported from underneath on rolled joists. Fender piles and wailings of American elm are placed in front of each seaward pile at the head. Messrs Head, Wrightson, & Co., engineers, Stockton-on-Tees, who, under the inspection of Mr James Brown, C.E., Millport, designed and carried out the construction of the pier, experienced many difficulties in the works both from stormy weather and the rocky character of the bottom into which the piles were set.

L I G H T H O U S E S .

THE Cloch is, in its way, the first radiant landmark on the Firth. It is a stately and elegant structure in the form of a tall white tower, with 80 feet of altitude, and shows a steady and stationary star-like light. It was erected in 1791, and in clear weather acts as a beacon for a distance of 12 miles. Previously, it was nothing more than a huge fragment from a hill-side, called Cloch-an-Ri, viz., the Royal Stone, which was blasted to rear the present "light."

The only other structures of the kind which, from their marine importance, fall under our jurisdiction are the Toward and Cumbræ Lighthouses. The former, which stands $56\frac{1}{2}$ feet above high water, was completed and lighted for the first time in 1812. Originally, it displayed a revolving white light, giving a flash every 52 seconds. In June, 1873, it was altered to a fixed light, showing a flash every 10 seconds. The whole illuminating apparatus is kept in capital order by a well-trained keeper and assistant, who are supplied by the Clyde Lighthouses Trustees with separate dwelling-houses at the Point.

The tower of the Cumbræ Light was built in place of a less serviceable erection in 1826. Its elevation is 115 feet above high-water mark, the base being a rock of 80 feet in height, while the altitude of the building is 36 feet. The

lighting apparatus consists of 15 oil lamps, which are respectively provided with a silver reflector admirably adapted for diffusion. In certain conditions of the atmosphere, this Light, it is said, can be seen at a distance of about 30 miles.

In 1750, a tower, still standing, was erected as a lighthouse for the Scottish coast, which, while reckoned a great benefit to the shipping of the Clyde, was simply lighted by a coal fire placed in a large grate.

Further steps, however, are about to be taken by the Trustees for the safety of vessels. Fog signals, in the shape of a gong or bell, are to be placed at Kempoch Point, Battery Point, and probably also at Prince's Pier; and with the view of giving distinctive characters to such Lights as those above referred to, Sir William Thomson has suggested either extinctions of gas or revolving screens. He is of opinion that it would be found an economy, which would cover the whole of the expenses of alteration in the course of two or three years, to convert the Cloch into a gas lighthouse, and as such it would be known in a moment from any other light whether on shore or at sea.

At present, the shipowners are taxed for the maintenance of the lighthouses, but the time has come for the abolition of these dues. As has been remarked, the burden at present is unequal, and oppressive to foreigners, many of whom give the benefit of *their* lights free of charge to all the world. We are the only great maritime power that taxes for that which is of international as well as national advantage. The maintenance of the lighthouses at the public expense would not be appreciable; and even though it were, it would simply be paying the amount in a different manner, for the shipowner at present lays his dues upon the consumer.

THE COAST.

ON FURLOUGH.

Io triumphe—I have triumphed. But my hearty thanks to the governor notwithstanding. Although a shade imperious and exacting, he is by no means winter-hearted. In a whisper, Colin Sharp, Esq. of Graball, is, in the strictest sense, a self-made man; and, with the satiric Lothair, adores his maker.

I would not, however, be personal. And Mr Sharp's notorious illiberality in the matter of periodical holidays can in a sentence, be explained. He, good old man, regards his splendid success in business as the result purely of unre-mitted attention to duty—of having, during the earlier years, at least, of his commercial life, accustomed himself to no luxury but that of work. He is of the old school, you see, and delights to this day to speak of his father having, when a law student, studied eighteen hours out of the twenty-four.

Few men, perhaps, actually break down through extreme application to business; and no doubt the feeling of over-work is, in many cases, a sheer delusion; still, in this keen competitive age, those in the worry and whirl of city life are glad to resort at times to the restorative virtues of coast or country air. Hence this amphibious longing of mine for a week's furlough down and round "the water."

My champion friend of the B. C. (a jolly dog in his way) had promised to accompany me off the chain. He drew back, however, at the last moment. Like Horace Walpole, he could love his country very much if it were not for his countrymen. *Cattavi tempi* was his reply to my final entreaty; and the cause of the cruel collapse was clear as crystal. He had somehow got his mind poisoned with cockney chaff. "Licensed extortioners;" "greedy landlords with moustrous jaws;" "polished knaves ready at all points to fleece the unwary," are a specimen of the many drawbacks which he saw with his "mind's eye, Horatio!" These, of course, completely closed my urgent importunities; and there was nothing for it but that I should bound off alone into the bright fresh world. And why not happy as a lark in spring? Travelling is a luxury, and must be paid for. Palatial edifices! and exorbitant charges! Pshaw! My trip shall be no longer than my purse.

Dundas Street Station is my starting point per rail. Free of all encumbrances, save a simple knapsack, I, elated as Lady Gay Spanker, who wished all nature had but one mouth that she might kiss it, follow up in the rear of an interesting train of passengers, and book for Dunoon. No sooner, however, have I taken the platform than a lynx-eyed porter, who has seen my effervescent state, interests himself deeply in my traps. "Any luggage to be labelled, sir?" Nothing, thank you, but the knapsack here, and—I'll stick to it myself.

The stir, on alighting at Helensburgh, is striking. Family people, especially, who are going on by the steamers, the bells of which are already ringing for passenger push, interest themselves excitedly in the turn out of luggage, varied in its character as the colours of Harlequin's coat. Gouty

old gentlemen, and corpulent young ladies, are not few among the bustling crowd ; but it is comforting to see the special attention given these by the energetic and dutiful station agent. I spend the night at Helensburgh, and find it a most enjoyable sea town. Founded in 1774 by Sir James Colquhoun, great grandfather of the present Baronet of Luss, it was for many years a village of no importance, and would probably have remained so had not Glasgow taken it by the hand and many of her thriving citizens made it their permanent residence. Then came the erection of villas and cottages, vying with each other in artistic taste. And these lying arborially adorned for the most part on upland ground, their situation gives them every advantage in appearance. The public streets, too, are perfect in plan and space, being nearly sixty feet wide, with a parallel run. Shorewards, however, I at once betake myself to inhale the zephyrs perfumed with brine. And what a study for the painter is the sea-nymph traffic here ? On the sands, facing the leading thoroughfare of the town, some dozen of girls, bordering on womanhood, are busy stripping to join as many others disporting and “dooking” mermaid-like in the cooling firth. And what is the song of those merry minxes ? I give it freely as fancy dictates :—

“Fluttering spread thy purple pinions,
Gentle Cupid, o’er my heart ;
I, a slave in thy dominions,
Nature must dispense with Art.”

Shall I venture to moralise a bit from my sea-side seat ? Excuse me, pray. If the exhibition with its laxity of decorum does not please, I am at liberty to pass on. And, by and bye, I stroll out to the west. Nor could a more re-

freshing and delightful saunter be desired. The day has been extremely brilliant, and the grand mountain piles at the head of the Gareloch, (or Gearr Loch) rising in bold relief to the cloudless sky, are now in a blaze of light, with their peaks veiled in golden mist. Anchored in the centre of the loch, which goes inland 6 miles, lies the training ship *Cumberland*, and on the rigging of the floating reformatory several of the juvenile crew are perched. Beyond Ardincaple Castle—a fine old building—the sand lies broad on the loch's shore ; and from this “mare-like point” a splendid view is got of the charming nooks—Row, Roseneath, and Clynder. But the shades of night are falling, and falling fast ; so I retrace my steps leisurely to supper and sleep.

Next morning, I proceed to Dunoon by the *Dandie Dinmont*. The pier, in push and bustle, is simply a reproduction of the railway platform. In addition to the Dunoon and Gareloch steamers, the *Ardgowan* from Greenock impatiently waits her complement of passengers ; and the coast-bound crowd, flocking down to their respective boats, have all but blockaded the pier. But an inlet must be got. The steamer roars frantically for freedom, and the bow rope is being cast from its pall. So by the nearest gangway I get on board. From the glorious morning, bracing as yet, though brilliant, the *Dandie's* deck has been the general resort ; and not even for one of Pharoah's lean kine is there a vacant seat either fore or aft. It is a pleasure, however, to see such a magnificent boat so handsomely patronised. To speak of it as a floating palace is no misnomer.

To the right on leaving the pier, Roseneath—Ros-an-oigh, Virgin's peninsula—and the Gallow Hill, are seen to full advantage. A foreground of dense foliage, however, conceals from view the castle of the Mac Mhic Cailean Mor.

But not the romance which historically belongs to the peninsula. It was to this sequestered spot that Jeanie Deans was brought by John Duke of Argyle, after her heroic journey to London on behalf of her unhappy sister Effie. "Ian Roy Cean!" a really remarkable character in his way. Famous as a Duke, poet, statesman, and soldier. Wallace, too, if history may be trusted, fought one of his smaller battles in the Roseneath neighbourhood; while the notorious Balfour of Burley found here a peaceful death-bed. The castle although situated, as I said, on a fine natural elevation is all but hid with intervening foliage. A five-pillared portico, and a circular view tower, are its chief embellishments. The original edifice, which stood nearer the shore, was destroyed by fire in 1802. Amongst the old trees on the estate are two magnificent silver firs, 21 feet in circumference.

Kilcreggan, one of the most charming of the Firth's hamlets, lies at the south-west point of the ducal demesne. Other things being equal, here, to a certainty, would my vine and fig-tree be planted. From the steamer, the cluster of villas which bask by the shore look quite paradisiacal, and, with a church of Gothic beauty, stretch round to the coaxing Cove.

Strone is the next place of call—the Point where Loch Long and the Holy Loch branch off from the Firth. The sail across the gleaming bay is supremely beautiful. The grand amphitheatre of hills, which seem actually to close in the lake, show, with clearest outline, their every scaur and jagged crest. Natural, then, that at the very heels of admiration should follow the enquiry. "What, sir, do they call the lake to the left?" "The Holy Loch," is the reply. "An odd name isn't it, sir?" Well, perhaps; but here is the legend:—In the days of St. Kentigern, a ship sailed from

the Holy Land with a cargo of consecrated earth for the basement of Glasgow Cathedral; and, as fate would have it, was stranded in the loch. Hence its name—*an loch sèantra*—the charmed loch. The story is scarcely told when Dunoon is reached.

DUNOON.

Here I take leave of the *Dandie*, and have disembarked into the very heart of sea-side society. What a pier with gay and ogling spectators! But it is interesting, that motley gathering of loungers; and quite defensible, too, though it should simply serve to break the monotony of otherwise vacant hours. Dunoon, however, is not what it once was, nor what it might be. Its natural beauties have lost nothing of their attraction—its green Castle Hill, embracing such a wide and varied view of sea and shore; Kilbride Hill, and Balgay Burn; the West Bay, with its numerous villas; the Innellan Road, and the Bull Wood; the drive to Holy Loch, with the lofty ridge of Finnartmore; and the romance and beauty that crowd and cluster around Glen Lean, Glen Messen, and Loch Eck, can never fail to fascinate; but the increase of population, the daily turmoil of public trips, and extension of buildings, all contribute to make Dunoon, in some respects, objectionable as a coast retreat. Its etymology is perplexing. One who slept in the place when it consisted of a row of thatched houses, suggests that the prefix *Dun* signifies *hill*, and that *oon*, according to the old Scotch meaning, is a corruption of the word *oven*; and that, consequently, Dunoon may be defined the *hill of the oven*—the locality where of old the Highland clans met and baked their bannocks previously to entering upon a grand foray or campaign in the low country. In

Pont's Map, published in Black's Atlas, it is written *Dunouy*. In Gough's edition of Camden (iv. p. 124), Denoon; and by Macpherson, in his Geographical Illustrations, as *Dunhun*, and *Dunhovyn*, which he calls the "capital castle of the lordship of Cowal." This, too, is the form in which Wynton puts down the word. He says (B. viii. c. 29, p. 161) :—

“ Quhen the Brandanys of Bute herd say
That thare Lord in swylk aray
Had tane *Dwnhowyn* intil Cowall,
In by with hym thai ras all hale.”

Fordun writes Downhowme; Boice, Dounhome; and Buchanan, *Novio Dunum, vel Dunum novum in Covalia*; which Irvin explains to be “Dunoon Castle in Cowal, be-east Towart Point,” a term which is derived, as it is stated in the Statistical Account, from the Gaelic *Dun*, a Castle; and *Nuadh*, New; that is, *a new castle*; the place having been so denominated by comparison with the castle of Dumbarton, which is in its neighbourhood, and which was the main fortress of the kings of the Strathclyde Britons. This deduction, however, it is almost unnecessary to say, has not proved satisfactory—it being looked upon as merely an ingenious explanation of one of Buchanan's metamorphosis (Lib. ii. c. 33). It is the view of the writer of the old Statistical Account that the name is derived from *Dunnoogh*, which, in the Gaelic, signifies the *house of the virgins*; and hence he starts the conjecture that a nunnery was set down at or near this place at an early period. Others suppose that *Dunhovyn* is the earliest form of the word; and that, therefore, it is probably derived from the Scandinavian or Icelandic.

Immediately on leaving the wharf I take to the Castle

Hill—not for anything, however, that is to be seen of the old fortalice, for few vestiges of its structural strength remain. Time, verily, has played perfect havoc with the building. But here is a certain compensation. In my smoking lounge, I drift mentally down through the historical past, and picture the castellated edifice, in middle-age beauty, with Queen Mary and her sister, the Countess of Argyll, sitting radiantly at its festal board after an exciting deer-hunt on the pastoral Benmore.

“ So vanishes, grows dim, and dies,
All that this world is proud of.”

Associations, however, of another hue cling ivy-like to the fragmentary ruins. The castle, in fact, seems to have been a perpetual bone of contention amongst the dogs of war. It is unquestionably of great antiquity. It belonged to the High Stewarts of Scotland, and was conferred on the first of them, Walter, the son of Allan, by Malcolm IV., called the Maiden, the grandson of David I., during the 12th century, when he obtained Bute and Cowal. It remained with this family till the time at which Edward Baliol, with the assistance of Edward, overran the kingdom during the minority of David II, and although it was then taken, it was ere long regained, for the nobles were so ill satisfied with Baliol's pusillanimous conduct that they stood forth bravely in support of Robert the High Stewart, afterwards Robert II., the son of Marjory Bruce, who, for a while after the battle of Halidon Hill, had lain concealed in Bute. Having been enabled to cross over to Cowal, he, with the aid of Sir Colin Campbell of Lochowe, a distinguished ancestor of the Argyll family, was successful in taking the Castle of Dunoon, in the year 1334. For Sir Colin's gallant and effectual conduct, he

was, according to Pennant, not only appointed Governor of the Castle, but had several lands conferred on him in order that he might be the better enabled to support his rank. The Castle became a royal residence on the accession of Robert II. to the throne, and had its appropriate motehill, gallows place, and *butts* for the practice of archery. In 1544 it was taken by the Earl of Lennox against all the resistance which the Duke of Argyll could oppose, who in the conflict lost about eighty men. This was at the time when Lennox was desirous of obtaining the Regency during Queen Mary's minority, and when he entered the Clyde with a naval force, which was supplied to a great extent by Henry VIII., and carried devastation into the Island of Bute and several adjoining places.

But I am pleasantly roused from my historical reverie. "A grand tid of weather, sir," is the exclamation from the south-west shoulder of the hill. I start, and confront a wheezing old gentleman, accompanied, as I was afterwards told, by his only daughter. The story of his visit to the coast is given with painful minuteness. He was living under an acute and, as he feared, incurable disease, and had come to Cowal to see what effect the water-air would have in fortifying his constitution against the advances of the pale-ridden malady. The step, I observed, was surely sensible—a decided improvement upon Medea's resort, who, to revive the youth and vigour of her father, Æson, boiled him with certain magic herbs in a cauldron. My object was gained. Melancholy, for the present, had been scared; and facing the sparkling firth, the old man's eyes glistened with the grandeur of the scene. On parting, I could see that he still clung fondly to the brittle reed of life, which, in my descent, accounted for these lines coming forcibly to my mind:—

“ With Love, time flies ;
 Hate, makes it linger ;
 Says Youth, Be past !
 Age, pointing to its sands with eager finger,
 Murmurs, Too fast.”

For an hour further, I abandon myself to royal idleness. The day is delicious—a strong sunshine, from a sky in which the last generation of clouds seem to have been swallowed up, being tempered by a gentle breeze from the west. But still not a breath of air plays upon the waters of the shimmering firth.

“ There was not a sound but the breath we drew,
 And the lap of water and creak of oar.”

Basking on the rocks opposite the Castle grounds, I watch with intense pleasure the frolic of numerous youngsters who, having thrown spades and tiny barrows aside, paddle and prance in the water with tucked-up trousers or kilted petticoats, and run up merrily to the sandy beach as they are ever quickly pursued by the inflowing waves. Smith graphically describes my position otherwise :—

“ The bridegroom sea
 Is toying with the shore, his wedded bride ;
 And, in the fulness of his marriage joy,
 He decorates her tawny brow with shells ;
 Retires apace to see how fair she looks,
 Then proud, runs up to kiss her.”

Hurra ! Can I believe my eyes ? Who is here on the beach but friend Frank. Need it be added that the remaining portion of the day passes fleetly, with a pleasure rare as a furlough ramble.

In the evening we walk out to Ardvullin. At the Convalescent Homes a concert is being given by Miss Clugston

to her invalid-nurslings, which, although an amateur entertainment simply, is most enjoyable, both in its voices and instruments. Nor is the assembly-room by any means hospital like. A few countenances, perhaps, bear a somewhat jaded and depressed expression, speaking too plainly of physical weakness ; but the brilliantly lighted hall, the exhilarating music, and the happy presence of the philanthropic promoter of the Homes, are more than a match for the facial evidences of debility. I fear that this excellent institution, with its unrivalled advantages for the bracing of nerves unstrung, is not fully appreciated by the industrial classes. It was for such that the Homes were established.

L O C H E C K .

So much for the night. Next morning arrangements are made for a drive to Loch Eck and Glen Finnart. With a smart little mare and light waggonette, we start, under an almost blinding glare, on a trip of unrivalled grandeur. Quitting the outskirts of the town, Lochlin—a fine sheet of water, heather-fringed—is passed on the left. The road from this point, until whirling down upon Ardenadam, gets a shade hilly ; but it then winds forward flatly to Cot-house Inn. Here a purple flank of Benmore boldly faces us, and which is but introductory to many successive scenes of high-land beauty.

“ Bright is the bloom of the heather
On the brow of the purpled hills.”

Now we cross the Eachaig, and as we drive along the narrow road, boulder-walled on the right, a glorious peep is got into Glen Messan, when comes a passing regret that we cannot deviate, with pedestrian freedom round by the bracken-clad hills, into the heart of its wilder gorges. “ O for a soul for

scenery," says Frank. As we proceed, the road narrows into a width which adds much to its interest. At many parts, a pair of machines cannot pass each other; and, as circumstances will have it, we land amid a profusion of junipers to allow a festal wagonette, which has just put in an appearance round one of the sharp bends of the road, to roll on its way rejoicing. Hats are lifted, and a holiday cheer echoes from the hills.

" Happy we've been a' thegither,
Happy we are ane and a'."

And yet some cynic has said that life would be tolerable but for its pleasures.

Reaching Loch Eck, the scenery becomes intensely wild with its array of mountain summits. A rugged and perpendicular wall, with many tattered yet resplendent peaks, rises abruptly from the western edge of the lake, and casts a richly dark shadow over its unruffled face. The Loch, however, which runs south and north, is a small one comparatively, being only about seven miles long and half a mile broad.

Charlie's Inn cannot, with common courtesy, be passed. It is to all intents and purposes an oasis in the desert—a way-side hostelry which must delight the heart of many a weary pedestrian. Frank, too, in the character of Jehu is Christianly considerate of the comforts of both man and beast; and knows from previous visits that the Loch Eck Inn, with all its severe simplicity, is well worthy of a passing acquaintance. Charlie makes an excellent Highland host. Within the humble hostelry we enjoy a delicious interval of rest. Charlie's welcome is homely, and his good cheer abundant. On our entrance, the "awmry" doors are at once thrown open, displaying a plentiful store of biscuits,

butter, eggs, and cheese—country fare, pure and plain, you see; but Charlie in the service of the common restaurant dainties would be as much out of place as a daisy in a conservatory. Frank, at this stage, alluding to the melting heat, is quaintly advised to get moistened with mountain dew.

Before resuming our tour, we adjourn for a brief lounge to the verdant margin of the loch, “the world forgetting, by the world forgot.” The scene, with its grandeur of lake and fell, is gazed on with breathless delight. Beautiful the loch, lying so peacefully under the bright glory of the sky; and matchless the splendour of its guardian hills, which, with their thunder-rifted gorges, castellated crags, and cloud cleaving crests, seem to frown down on us with a mien of stern and striking majesty. The prospect eastwards is romantic, but not imposing. A sort of shaggy wildness broadly meets the eye, with cattle browsing on broomy holms, and sheep dotting heathy hill-sides.

We cannot, however, tarry longer by Loch Eck. Katie is again in yoke, cocking her ears eagerly for a further run. Frank jocundly resumes the reins, and with a hearty salute to Charlie we start for our next stage. The drive along the lake’s edge is short ere we come to a point of divergence. To reach Whistlefield we have to turn easterly into a steep hill; and Frank and I here taking the road on foot, make the ascent panting and perspiring like a couple of Falstaffs. But we erred foolishly at the outset. Our pace was too quick, and our tongues too loose. Resting for a breath on a bank of heath bells, “It is a mistake,” says Frank, “our style of hill-climbing—bolting it in physic fashion.” Frank and I meet our friend Colin here, who, with other three “dogs off the chain,” have been enjoying a few days’ fishing

with mine host—Donald Taylor. Like ourselves, they are fascinated with the surrounding scenery, and will have their tour written down a “red letter day” in their annual furlough.

On gaining the top of the brae, we look down upon a magnificent panorama. Taken as a whole, a lovelier Highland scene, perhaps, is not in bonnie Scotland. Wilder prospects there are within easy distance—mountains more lofty, corried, and grim; lochs of greater expanse and more fairy-like beauty; but where, even in the heart of fair Caledonia, reposes such combination of hill and lake, bosky dell, and sunny mead as now enchants us from the heights of Whistlefield? We have to ascend still higher, before entering the valley of the Eachaig. The walk—for we are still on foot—is through a bleak and mossy waste, where no living presence beyond ourselves is seen for miles. At intervals a bee hums past us, and a plover wheeps overhead; but these stray sounds of the moorland only serve to deepen the mute eloquence of hill and heath. As for the tiny rills, which everywhere ooze from out the blooming heather, they, in their noiseless flow, seem to have caught the very spirit of the brooding stillness.

The descent into the rugged defile is abrupt. Rather “kittle” work driving through such a narrow pass. The strath, too, with the towering mountains which bound it on either side, gets wilder at every turn. It is to me a study—yea, a treat in itself—to note the gradual increase of hill sublimity. Over the whole valley the chains are quite Alpine in character. From a naked and rocky foreground, they rise boldly with savage ledge and gloomy chasm, until their bare and shattered peaks kiss the cloudless dome. Southwards, there is still the air of absolute

isolation. Not even a single shieling stands on the solitary wilds—" 'Tis true, 'tis pitiful ; pity 'tis, 'tis true." So much for the cruel clearance system. At last, however, appear a shepherd and his dog. The chance of a passing companionship is too much for terrier Dick, who, though seated in front with Frank, is doggedly determined to descend. He gets a quiet cuff as a check to his social exuberance ; but, in a twinkling, down he leaps, and runs with an affectionate embrace for the astonished collie. The meeting, so full of canine fellowship, of those two dogs is worth all the danger and delay of a down-hill pull up.

Ere long, the mountain hollow gives place to sunny patches of arable land, and hedgerows sweet in bloom. Now we are on the outskirts of Ardentinnny, a humble hamlet delightfully situated on the western shore of Loch Long. Tannahill has given the place a name worthy, in sweetness, of himself and it, in the kingdom of song :—

“ Far lone among the Highland hills,
 'Midst nature's wildest grandeur,
By rocky dens and woody glens,
 With weary steps I wander.
The langsome way, the darksome day,
 The mountain mist sae rainy,
Are naught to me when gaun to thee,
 Sweet lass o' Arranteenie.”

Here (but not in a very inviting inn), we again enjoy a general refreshment ; Katie, the mare, especially requiring a rest and feed. She is, however, a plucky little animal, and to all appearance walks into the stall as fresh and hearty as when she started some eight hours ago from Dunoon. It is at this point where Glen Finnart opens.

Again in yoke, we drive for a considerable distance

along the open shore of the Loch. Kilmun (Cill-a'-mhuna) and Strone are eventually passed on the highland side of the Firth. Then, Ardenadam with its bright belt of villas. But such bare mention of Kilmun is, perhaps, scarcely fair to its antiquity. St. Mund, from whom Kilmun takes its name, was a native of Ireland. After acting as a monk for some time he finally made his abode on the banks of the Holy Loch, where he founded a monastery and was buried. That the word "Cill" means burying-place, and not a church, is quite evident from localities in the Highlands called "Cill," where there never even was a preaching station. The Parish Church was erected into a collegiate church in 1442 by Sir Duncan Campbell of Lochowe—the first peer of the family. The Knight died in 1453, and was buried in the church which he had thus founded. From this time Kilmun became the burial place of the house of Mac Cailin More. Among the chiefs whose bones repose here is Archibald, the first Marquis of Argyle, who was decapitated at the Cross of Edinburgh on 27th May, 1661.

Much in its favour could have been said of the splendid serpentine road which leads from Ardentinn to Kilmun; so lovely, on the one hand, with its shimmering mere; and, on the other, with its muster of tiny knolls, leafy coppices, and flower-decked lawns.

" It is summer, and the roses,
Gay as bridegrooms, fill the land."

Finnartmore, the nasal point referred to as I entered Strone by the *Dandie*, has also been passed with silent admiration. It is, however, a ridge of gigantic features; and its lofty summit must command one of the finest and most embrative views offered by the loch-hills of the coast. Justice

to the prospect presented from this peerless promontory would require the pen of a second "North"—another child of the Sun.

We see little of the remainder of our run. Evening has already robed the landscape in "sober livery;" and, for the last half hour, I have been eagerly watching the coming on of "twilight grey," and the dying sunbeams which yet linger in the west. But do not the dim fields of the pensive gloaming fall in appropriately with my imperfect description of the glorious tour through which we have hurriedly run? Pen, in fact, at the best can only convey faintly to the imagination of the reader the supreme grandeur of these Highland scenes. So, here, Lamb's famous apology is mine. A fellow passenger, per stage coach, having been kept awake half the night, remarked that he (Lamb) had a bad cough. "It's the best I can give you," stammered Charles.

R O T H E S A Y .

Another excursion must be planned. And here comes one of the benefits of being located in Dunoon. No spot could be more convenient for making a general tour of the firth and adjacent lochs. It is in every way advantageous. We think of Largs and Millport, both pleasant and most enjoyable loopholes of retreat; Arran with its magnificent glens, gigantic fells, and lovely bay; and Ardrishaig with the intermediate grandeur of the Kyles of Bute. But Rothesay is the place ultimately selected for a visit, and taking the *Iona* down the firth we find ourselves in a literal congress of nations. Apollo's fiery shafts, however, are gone. The smiling sky has got ashen-hued and grey. An ominous sound of rain is heard on the panes of the saloon, and the change is certainly vexatious; but the day being still young there

is hope, with the breeze that is rising, of the murkiness and mist clearing off. Speculations relative to the weather lead to a general conversation with a party of tourists. The route that they have mapped out is Oban *via* Lochawe. From Ardrishaig, a coach runs to Ford, passing through a district at once rich in natural scenery, historical landmarks, and legendary lore.

What a hubbub and throng. Captain M'Gaw, than whom a more efficient and gentlemanly officer never guided a steamer's wheel, lands a good population himself upon *Eilean Bhoit*—the island of Boii-tes. Rothesay apart from being an invalids' haven is a favourite resort of the families belonging to the smaller merchant class of Glasgow and towns to the east. Falkirk faces alone may this month be counted by the score. Many advantages favour its popularity. The boat connection, for example, with the G. and S. W. Railway, *via* Wemyss Bay, brings Glasgow and the "Madeira of Scotland" within 90 minutes' travel; and this service means much to those whose business requires their presence early and late. And the town, through enlightened energy and taste, is unquestionably fast gaining in public favour. Less than twenty years ago, as was lately remarked, the traveller who approached the capital of Bute by steamer beheld a beautiful bay, the inner curve of which was a marvel of deformity and dirt. But Rothesay has latterly had the good fortune to be governed by a succession of shrewd and enterprising men who took a special delight in cutting down and sweeping away, bit by bit, the masses of ugliness that marred the appearance of the place. It has been pleasant to watch the progress of this regeneration. The formation of the Esplanade was a piece of most praiseworthy work, but the very hills above the town have been, in a sense, carved

into a condition of ornamental usefulness ; and at every fair angle or curve a villa like a temple has sprung into existence through the prevailing green, and given to the whole bay an aspect of exquisite sweetness. Those who had done so much for their native town could not rest content with their conquests. Their energy had not yet been expended, and taking a new form under scientific suggestion the first Aquarium in Scotland was the result. This is a great thing to say for Rothesay, which deserves a world of credit for carrying so splendid a scheme to completion. One happy circumstance has been all along in favour of the place which ought to receive emphatic and honourable mention. The great landlord of Bute has been inspired by the most enlightened ideas of duty. He has not checked the progress of the island by refusing to feu land for building purposes ; but done the reverse ; not only encouraging building, but, in some notable cases, opening up his own special domains for the recreation of the people.

The foundation stone of the Aquarium was laid on 5th June, 1875, by Mr Charles Dalrymple of Ardencraig, M.P. for Buteshire, and was opened on 29th June last. It has been erected on a site granted by the Marquis of Bute on the Ascog shore, on the spot formerly occupied by the old battery. The frontage towards the sea is 102 feet in length and 22 feet in height, having a restricted basement and cornice, and an open balustrading above. In the centre an ornamental tower rises to a height of 47 feet. On each side of the main entrance, which is approached by a short flight of steps, are Corinthian pillars, while, inside, a number of similar pillars have been erected, and contribute both to the stability and beauty of the structure. The floors are laid with encaustic tiles. Passing through a fine vestibule, the

visitor enters the promenade hall, which is effectively lighted from the roof, and is intended on special occasions to be set apart for conversaziones and concerts. Leading from this hall on either side are table tanks, refreshment-rooms, and retiring-rooms. The main area of the building is comprised of a corridor, 90 feet long by 15 feet wide, which adjoins the hall. In this space are fitted up the majority of the tanks, the occupants of which give the distinctive character to, and form the principal attraction of, the building. Sixteen show tanks, built up with slate slabs on the back and sides, and with thick plate-glass in the front, are arranged on both sides of the corridor. Others, intended for the reception of lesser specimens of marine and fresh-water animals, are placed in side rooms leading from the principal hall. In all the tanks rockwork has been introduced, both for the comfort of the fishes and for artistic display. Besides these there is a number of what are called probationary tanks, in which the various new specimens are placed as they arrive, and in which their habits and behaviour are watched before show-room is allotted to them along with their prospective neighbours. Some idea of the magnitude of the tanks is obtained from the statement that they contain 30,000 gallons of water. Provision has also been made to secure the perfect aeration of the water by the construction of tanks capable of holding 140,000 gallons, placed below the basement, but so adapted as to present a large surface to the action of the air. It is intended that several tanks shall be used for the promotion of scientific research, more particularly in the department of embryology. The piscatorial collection will become more and more valuable as time runs on. The cost of the Aquarium before completion will be about £13,000.

The only object of antiquity in Rothesay worthy of note is the old castle which stands close upon the town. It cannot, however, be mentioned alongside the three "English" mansions that a certain London writer particularised the other day as exclusively enthralling the senses of the Americans—Shakespeare's house at Stratford-on-Avon, Kenilworth, and Holyrood. This royal residence, with its round heavy shape, and red colour of stone, must at any time have been the reverse of picturesque. Prior to the reign of Alexander III. it is supposed to have belonged to a family called MacRoderick. In Haco's first expedition it was attacked by the Norwegians. Although the gate has been neither flanked nor machicolated, the castle from its high walls and ponderous form must have been of great strength. It was latterly burned and destroyed by the Marquis of Argyll in 1685.

The weather has not improved. Much therefore is lost of the pleasure that the many beautiful walks of Rothesay afford. On our return to Dunoon, we find the winds out vigorously with the waves at play; and then follows a wild evening of rain and driving mist. Old Neptune is unmistakably out of temper. It is plainly seen that the sea furies have work on hand. Next morning is even more squally, with the storm still from the south-west, and from the heavy pitching and heaving it is only with difficulty and danger that the steamers can take the pier. The scene, however, of the white-crested billows hissing and dashing in upon the sands and lashing the rocks in a sheet of spray approaches sublimity, and gives to the day which we spend on shore a fresh and lively interest.

LOCH LOMOND.

Alone again. Frank's few days of furlough are fled, but I have yet time for a run to Lochlomond—the Queen of Scottish lakes. Wondrous transformation. The weather this morning is calm and bright, with a sky all the more serene and beautiful from the preceding riot. Steaming for the noble Lochlong, a call is made at Blairmore—a pretty place withal, its straggling row of cottages lying cozily sheltered at the hill-foot; while the bold rocks that form its shore alternate with charming little bays, where the clear wavelets plash on white sand and beds of pebbles. All on board seem delighted with the trip and scenery. They

“Know the merry world is round,
And fain would sail for evermore.”

Reaching the mouth of the dark Lochgoil (*i.e.*, Loch Goigheann), the shattered ruins of Carrick Castle are seen situated upon a rock of gentle elevation. It consists principally of one large tower, of an oblong and somewhat irregular figure. In length it is 66 feet, by 38 in breadth, and 64 in height. The walls in some places are from seven to eight feet in thickness. This, too, is the scene of Campbell's tragic ballad, describing how the chief of Ulva's Isle stole away his bride from her angry father, and how both were swallowed up by the cruel and revengeful waters. “Argyle's Bowling-Green” soon comes in full view, with the strange rock crest of the “Cobbler,” and the silent sides of Ben Ima.

Arrochar, which is at the head of the loch, is a quiet and secluded hamlet among the mountains. From this point a coach runs across the isthmus to Tarbet. “Shanks' omnibus,” however, is generally preferred by the

tourist. The walk is through shady avenues of luxuriant trees, and only about two miles in length. Loch Lomond never looked more beautiful than now. It is, without doubt, the paragon of Highland lakes, exceeding all others in variety of scenery, as it does in extent and splendour. Few travellers are ever likely to forget such varying and superb grandeur. How lustrous in their green loveliness, the woody islets asleep on the breast of the loch; how serene the mountains, with warm fleecy clouds floating on their massive sides! Here, in full view, we have the kingly Ben stretching supremely into the blue of heaven. There is no mountain like him so regal—towering with haughty head triumphantly above his fellows. Those who wish to climb to his noble peak land at Rowardennan. The distance from the inn to the summit is six miles of a continued ascent, which can be easily travelled in three hours. The speel, even with the stimulating influence of a buoyant and exhilarating atmosphere, is undoubtedly toilsome; but as you rise a wonderful panorama spreads itself out below. And the scene from the top, on a clear day, fully repays the fatigue incurred. No other Ben, not even Goatfell, presents such a combination of the enchanting and the sublime, extending across the country from sea to sea. Eastward may be seen the chimney of the St. Rollox Works, Arthur Seat, and the Bass Rock in the Firth of Forth. Westward rise the majestic peaks of Arran and the inner Hebrides, and further down the Firth of Clyde, Ailsa Craig, far more imposing than the Bass. Southwards lies Loch Lomond, now still in the afternoon sunshine, and dotted with fairy-seeming isles, a pleasure-boat or two here and there gently disturbing its surface; and far beyond the green sloping hills of Renfrew, Ayr, and Lanark. Northward the Grampians rear their

magnificent head, and close the view with that massive rampart beyond which Cæsar and his legions were never able to penetrate. Many years ago, an English gentleman wrote the following lines upon the window of the old inn here. They contain useful hints for all who may find themselves impelled by an enthusiasm for the grand in nature to scale this lion of mountains, on which the sunbeams love to play and the vapours love to rest.

“ Trust not at first a quick advent’rous pace,
Six miles its top points gradual from the base ;
Up the high rise with panting haste I pass’d,
And gained the long laborious steep at last.
More prudent you, when once you pass the deep,
With measur’d pace ascend the lengthen’d steep ;
Oft stay thy steps, oft taste the cordial drop,
And rest, oh rest ! long, long, upon the top.
There hail the breezes ; nor with toilsome haste
Down the rough slope thy precious vigour waste.
So shall thy wondering sight at once survey
Vales, lakes, woods, mountains, islands, rocks, and sea ;
Huge hills that heap’d in crowded order stand,
Stretch d o’er the northern and the western land,
Vast lumpy groups ; while Ben, who often shrouds
His lofty summit in a veil of clouds,
High o’er the rest displays superior state,
In proud pre-eminence sublimely great.
One side, all awful to the gazing eye,
Presents a crag three hundred fathoms high.
The scene tremendous shocks the startled sense
With all the pomp of dread magnificence.
All these, and more, shalt thou transported see,
And own a faithful monitor in me.”

The loch, from Glen Falloch to the Leven, is about 25 miles in length ; and while its breadth at certain parts swells

out into seven or eight miles, it does not exceed 1700 yards at the narrowest point. Inversnaid, opposite which is the glen of Inveruglass, is the first and only important wharf above Rowardennan. Here the scenery is in the highest degree romantic, the surrounding heights being densely covered with wood. Neither is the upper part of the lake wanting in beauty, and the tourist if he would see Lochlomond in all its rich variety must steam over its whole length. At Inversnaid passengers land for Loch Katrine and the Trossachs. Adjacent to the inn there is a fine cascade where Wordsworth saw and sung of his "Sweet Highland Girl."

By the sail to Balloch a view is got of the picturesque group of islands with which the loch is studded. The *Prince of Wales*, with Captain Reid as conductor, is the handsome little steamer that makes the run down. Inchlonaig (the isle of yew trees) is about a mile long and above a quarter of a mile broad. For many years it has been kept as a deer park by the Colquhoun family to whom one-half of the 30 islands belong. Here there is an establishment for the restraint and cure of confirmed tipplers. Luss, now at hand, is a delightful little village, charmingly situated on the shore of the lake. The estate which belongs to Sir James Colquhoun came into the possession of his remote ancestor in 1224. Rossdhu, the splendid seat of the Baronet, is seen in the vicinity. The old castle—now demolished—continued to be the family residence till near the end of last century, when the present spacious mansion was built. Close by, one of the best white trout burns that feed the loch (the Fruin) runs in Glen Fruin, which is delightful in certain places for a tourist's scramble. At the entrance of the glen stand the ruins of Banachra Castle. All these spots are immortalised

by "Sir Walter" in that stirring song of "Roderick Vich Alpine."

" Proudly our pibroch has thrilled in Glen Fruin,
And Bannochar's groans to our slogans replied ;
Glen-Luss and Rosdhu they are smoking in ruin,
And the best of Loch Lomond lie dead by her side."

Inchtavanach (*i.e.*, the island of the monk's house) is about three quarters of a mile long, and two furlongs and a half broad. A monk, at a remote period, is said to have fixed his residence here, from whom the island derives its name. Inchconachan (*i.e.*, the dog's isle) is separated from Inchtavanach by a narrow sound ; and it is worthy of notice that this channel, the average depth of which does not exceed two fathoms and a half, and where there is no perceptible current, was never known to freeze even in the severest winters. Inchmoan (*i.e.*, the Moss Isle) contains about 100 acres, from which the surrounding inhabitants are supplied with peats. Inchcalliach (*i.e.*, the island of old women) was formerly the scene of a nunnery, and at a later period the site of the church of the parish, now called Buchannan. In its rocky graveyard lie the ashes of many a brave chieftain. From its striking resemblance in outline to a dead human body, this island is generally called the corpse of Lochlomond. Inchmurrin, which is the largest of the group, was long the principal residence of the Stuarts of Darnley, who obtained a re-grant of the title of Earls of Lennox. The Castle of Balloch having fallen into decay, this insular stronghold became in the fourteenth century their favourite seat. Latterly, however, it was used more as a hunting lodge than as a regular family residence. It was so used by James IV., who frequently visited Dumbarton,

and by James VI., when on hunting expeditions. The island at present belongs to the Duke of Montrose.

Balloch now comes in sight, and the steamer speeding through the waters "rippled as with living gold," soon reaches the pier. All on board eagerly make for the gangway, and betake themselves, without casting even one lingering look behind, to the railway carriages which are marshalled at the wharf. And yet the glance lochwards is enchanting—a picture for the masterhand of a Ruskin or a Turner. "To our right is the opening of the Leven, with Balloch Bridge spanning the new-born stream, and Balloch Inn—the veriest home of the beautiful—with Balloch Castle peeping over its green girdle of foliage in fine relief against a gentle range of undulating hills. To the left we have the sylvan braes of Tillichewan, with Cameron House gleaming on its own verdant plain, and the heights of Glenfruin and Glenfinlas swelling beyond. Immediately in front is Inchmurrin, with the soul-filling bulk of Benlomond rising majestic to the very floor of heaven." Instead of travelling by train, I walk along the south bank of the Leven to Renton. The course of the river, though no more than six miles, is exquisitely beautiful, and has an interest in the eyes of travellers over and above its real merits, on account of the admirable little poem by which Smollett has consecrated it. But since the early days of Dr. Tobias, this part of the country has greatly changed. Could he now revisit his native vale, he would no longer find it the scene of tranquil life, bleating flocks, and shepherds piping their rural lays; but of busy manufacturers engaged in most unpastoral though more profitable and practical pursuits. Amongst the principal works are those of Levenbank, (Messrs A. Orr Ewing & Co.) ; Dalmonach, (Messrs James Black, & Co) commenced in 1785 ; Cordale,

(Messrs Wm. Stirling & Sons) ; and Dalquhurn—the oldest in the vale—where bleaching was begun in 1728, and printing and dyeing in 1768. Smollett's ode is worthy of reproduction :—

“ On Leven's banks, while free to rove,
And tune the rural pipe to love,
I envied not the happiest swain
That ever trod th' Arcadian plain.
Pure stream! in whose transparent wave
My youthful limbs I wont to lave,
No torrents stain thy limpid source,
No rocks impede thy dimpling course,
That sweetly warbles o'er its bed
With white, round, polish'd pebbles spread ;
While, lightly pois'd the scaly brood
In myriads cleave thy crystal flood ;
The springing trout, in speckled pride ;
The ruthless pike, intent on war ;
The silver eel, and mottled par.
Devolving from thy parent lake
A charming maze thy waters make,
By bowers of birch and groves of pine,
And hedges flowered with eglantine.
Still on thy banks, so gaily green,
May numerous flocks and herds be seen,
And lasses chanting o'er the pail,
And shepherds piping in the dale,
And ancient faith that knows no guile,
And industry imbrown'd with toil ;
And hearts resolv'd, and hands prepar'd
The blessings they enjoy to guard.”

Renton, which was founded in 1782, consists of several streets, running from north to south, intersected by others

at right angles. A dirtier or more miserable-looking village is happily rare—dens of houses for the most part occupied by naked and slovenly families. Here a monument has been erected to the famous Tobias Smollet, author of *Roderick Random*, *Peregrine Pickle*, *Humphry Clinker*, the *History of England*, &c. It consists of a round column of the Tuscan order, and bears a suitable inscription in Latin. Dr Smollett, according to some authorities, was born at Dalquhurn House, in the vicinity, and according to others at Bonhill House, a short distance farther up the vale. He was the grandson of Sir James Smollett, Bart., of Bonhill, a member of the last Scottish Parliament, and a Commissioner in framing the Union. The father of Tobias, being a younger son, received, according to custom, only a small share of Sir James's fortune, and dying at an early age, left his family, consisting of two sons and a daughter, in circumstances by no means affluent. The two brothers received the rudiments of their education in the school of Dumbarton. After a life chequered by a variety of incidents, Tobias died at Leghorn, whither he had gone for the recovery of his health, in 1771 in his fifty-first year.

From Renton, I travel over by Carman to Cardross. The road for upwards of a mile is exceedingly steep, but the view got from the hill-top at the entrance to the broad expanse of moor is well worth the climb. The whole of the vale of Leven, with the industrial and out-lying pastoral effectively combined, lies unfolded before the eye; while the wooded hills and crags that stretch eastward, with Dumbarton Rock and the Clyde, are also embraced in the grand panorama. For two miles beyond this sun-scorched summit, the walk is through a waste of moss and heather. Although the public thoroughfare between Cardross and the Vale, not

a single pedestrian makes an appearance, and it is only on approaching the game-keeper's cottage, sweetly sheltered on the brow of the hill rising from the south, that the moorland stillness is broken. My footsteps have roused the pointer-pups and terrier-tenants of the kennel, which give vent to their displeasure by a discordant din of howling and barking. Here, on the west side of the road, is a richly-wooded glen, outside of which stands the modern and stately castle of Kilmahew. In passing down upon Cardross, another prospect of great beauty delights the gaze. In the foreground lies Cardross, shining and peaceful, with the lovely Firth expanding broadly to Port-Glasgow, Greenock, Roseneath, and Helensburgh—all as it were spread out at one's very feet. Cardross is a charming little village, with its handsome church, sweet musical bells, and shore-sited villas. In this parish, upon a small eminence known as Castlehill, stood a fort which was occasionally the residence of King Robert Bruce. No vestiges of the building are now discernible, but history and tradition further informs us that it was here where the favourite monarch breathed his last. A farm in the neighbourhood until lately paid, if it does not still pay, the superior a feu-duty called dog-meal. This tax is supposed to have been originally imposed for the maintenance of his Majesty's hounds.

But my time is up. The train from Helensburgh approaches, and within an hour I find myself once more in the heart of the busy and toil-taxing city.

To wile away the short journey by rail, I read over what I had written, during in-door hours spent at Dunoon, of

A ROCKIN' AT LANGLEES.

Old Nicol Harvey, from the cottage door, gave his guests a warm and winning welcome. Then a word, speculatively, about the weather.

"Weel, what sae ye, Langlees—frost is it tae be, belyve?" asked Glauf Lindsay, who had accompanied me over the dreich road from Hopedale.

"Deed, I'm no ower sanguine about an early set in o' drouth," replied Nicol, "thae wa' heads," pointing to the Ochils, "are uncless under cover. But come ye within, lads. Nae fear o' rain harmin' ye here, though aiblins some, no' a hunner mile frae the toon, are blamed for being o' themsels nichtly weet."

Until the arrival of the other members of the foy, a stroll over Langlees was suggested. Nicol, with aik staff in hand, at once seconded the motion, and covering his lyart haffets with a scarlet cowl, conducted us first of all through the byre. On entering, Lizzie, the maid of all work, brushed past us with her creepie (a horse-head skeleton) and milking-pail, and planted her seat directly under a rowan-tree branch, which was suspended from the rafters by means of a red string.

But the stable was the animal department in which Nicol chiefly prided himself. Glauf (another of the same) drew attention to one of the stall beauties.

"Ay, man," said Nicol, "and he wears a pair o' grand shoothers. A brawer cowt, I trow, ne'er looked through a brecham. Noo, jist tell me, Glauf, gin ye ever saw his

match atween the field there in which he was foaled and the back of beyont. That's a wide circumference, nae doot, but Captain 'll stand it a'."

Glaud again expressed himself eulogistically regarding the animal, adding that to a dead certainty he would be hard to beat. In depth o' breast, sharpness o' eye, length o' body frae tail tae shoother, tichtness and sturdiness o' limb, and in hinder muscular capawcitty, he thocht the cowl a perfect model.

On our return to the cottage, the full kirk party had arrived. And to me that farm-biggin', with its thatched roof, ivy-clad walls, and little garden rudely fenced, seemed a very ark of peace. Tea was soon served in the spence, and with it came the metaphorical manslaughter of the ladies. Mrs Harvey at the outset urgently insisted that her guests should make themselves thoroughly at home; and with such hearty encouragement to throw out their horns, the party would indeed have been of a singular type had they not made the night an occasion of roystering mirth. And there were those in that festal gathering who could be trusted as leaders in the cavalry of fun.

There were two reasons for the union of the harvest-home with Hallowe'en. Susan Sharp looked forward to the "New Year" as the day of her marriage with Allan Morrison, and Glaud Lindsay was expected to leave about Christmas time for a commercial start in Glasgow. Susan was made mistress of the tea party. To this interesting seat of honour she had, it seems, a positive right. Hard had been the contest on the harvest-riggs for the laurels of the "maiden," and Allan, ever first with plough and sickle, had the enviable good fortune to carry it home to Langlees.

Old Nicol, from his seat in the "elbuck" chair, spoke

reverently of the goodness of Providence in again bestowing upon him and his a cereal crop rare alike in quantity and quality. Seldom, too, had it been more favourably placed under the keeping of thack and raip. "But whaur are a' oor singers?" he immediately added. "Are we tae hae nae bit sang ava afore the mair steerin' diversions o' the nicht commence? Come, Glaud, start up 'Lassie wi' the yellow coatie.' Trow, man, ye're come o' a jovial house. Pechin, I say't—your worthy faither, some saxty year and mair, wis the vary life o' the hail kintra side. Weel could he sing that same bonnie bit ballad. Come on, Glaud, wi' the sang. Ye railly look an honest-come chip o' the auld block."

"Glaud's a poet, you maun mind, Langlees," observed Allan Morrison, "and I move that he gi'es us yin o' his ain compositions."

"That's weel minded, my cock," said the jovial host. "If original, sae muckle the better."

The foy bard, without further ceremony, thus proceeded:—

"Mag, yestreen I met your Jimmy,
And a happy nicht had we;
Guess the something he sent wi' me?
'Twas a smack nae less for thee.

Na! na! Robin. Ye're ower mindly,
Fine I ken the tricks ye try;
Though your manner is sae kindly,
Sic a gift I maun deny.

Will ye no believe me, lassie?
Why sae doubt my word and me?
Tuts! ye shouldna be sae saucy,
Tak' the kiss was meant for thee.

Weel, I really think I'll hae it,
Gin it cam frae his ain mou',
Sae just be as guid as gae it,
For the sake o' him I lo'e."

Glaud, both as poet and vocalist, was rapturously applauded. But the charms of the most enrapturing music even would have had no chance alongside the spells of that night,

"When merry, friendly, country folks
Together do convene,
To burn their nuts and pou their stocks,
And haud their Hallowe'en."

Alick Scott and Peggy Ross—a buxom, blooming, and bouncing lass—first of all went out to sow a handful of hempseed in the west corner of the stackyard, Peggy eagerly watching the while for witch or wraith. The night was one of the finest of the season—the sky a star-pierced sea of azure, in which the young moon floated like some silver skiff, while everywhere over the luna-lit ground of the steading all walked double—man and shadow. Alick, of course, was not a bit afraid of any something he might see, but still took the precaution to

"Whistle up Lord Lennox' march,
To keep his courage cheerie."

Hughoc Tod and Bet Taylor were next blind-folded for the kail-yard. And merry as the jubilancy of youth could make it was the convoy thither. The hand-linked couple were, of course, led kindly out to the garden, and on being left to the care of their guiding-star, some dozen steps from the fortune-freighted plot, Bett, with a decision and pluck worthy even of Hughoc, at once groped her way forward,

and pulled up as crooked and shankie a stock as ever grew. But there were lots of "yird" at the root; so says Bett, "if he's lang and shaughlie he'll hae mines o' siller, and that'll cover a multitude o' infirmities." Hughoc fell upon a very different sort of partner—his being all but perfect in growth; and the lad's luck could not have come truer, it was said, to the trig and lady-like figure of his darling Bett. After several other couples had subjected themselves to the same trying ordeal, chaffing became the order of the night.

"Sae I hear ye're gaun tae get marrit some o' thae odd months, Maister Elmslie," observed the gushing hostess; "and if it's a fair question, what may be the name o' the lass?"

"I'm intenden' tae tryst the Session-clerk tae gie the parish that bit o' news," replied Geordie; and I see nae reason hoo I should bark mysel' and yet pay for a doug."

"Weel answered," shouted Alick Scott; "oor side for ever."

"Dinna ye craw sae croose in the corner there," said Susan Sharp. "I could mysel' let the cat oot o' the pock. The intended's jist Bella Weir—naebody else."

"Aha! murder will oot," exclaimed old Nicol. "Railly, bairns, it coves a'. Frae sic stunnin' news, Jen Jamieson I see sits glowerin' like some wull-cat. Fa'n in love hae ye, Geordie? Then, my man, tak' ye my advice; the sooner ye fa' oot o't the better. Your love e'e's by far ower soon open. Hoosomever, ye're makin' a guid choice. It's an auld sayin', and a true yin tae boot, that gin ye want a clean bird, ye maun gang tae a clean nest. And Bella is railly a nice and weel-faured hizzie. The vermillion o' her cheeks will, I'se warrant ye, stand the washin'. Only, Geordie, ye maun be a bit cautious. Be King *Agrippa* for anither year at least,

and ye'll find that Bella and you will leeve a' the happier o' yer nest being weel feathered."

"Hoot toot ! gudeman," said Mrs Harvie. "it's my firm belief that ye've had an extra cinder in yer cup. My certy, but yer tongue's soople. And when ye tak' tae preachin' it's commonly mair frae the spirit o' Maister Baggy's cellar than that o'——"

Here little Nell (a granddaughter) popped in—half angel, half child. "Come awa, my sweet *hieruc*," said Nicol. "Isn't she a wee beauty? The flower o' the flock, and no mistake. Jist a perfect honeybud. Some lad wi' a flower-pot on hand will be liftin' her geyen early I'm thinkin'."

"Lo'd sake, Langlees," observed Miss Ronald, "ye needna be jist sae torry aboot the bairn. 'Tweel a wat there are nae fules like auld fules."

But Nell—a steering, chubby lassie—was the old man's pet—his merry Iambe. And it was most interesting that same association of winter and spring. Placing herself on a stool beside him, or mounting the bars of the old arm-chair, the little hempie's chief delight was to brush his hair and whiskers ; and so much, so genuinely, did her wee, warm, winning heart love him that should she ever marry she thought it would be an old man such as her grandfather.

Connected with the Hallowe'en festivities there was also an hour's apple-douking ; and from the depth of the tub the lads had to strip themselves of coat, necktie, and collar ; while the girls who floated about in whites had to dispense with their brooches, guards, and other fal-lals. At the hearth with the three luggies, Susan Sharp was the luckiest of the lucky. Thrice went her hand into that with the pure water, never so much as touching the empty vessel, or that with the foul, which told the lonely destiny of some dozen

others—of a life of garret blessedness with a domesticated Tom and a grey-plumed companion from the groves of Zaquebar. As for the nut-burning—

“ Some kindled couthie, side by side,
And blazed thegither trimly ;
Some started aff wi’ saucy pride,
And jumped out-ower the chumlie.”

At midnight, a sumptuous supper in its way was served ; and among the “chappit” potatoes there had been put a sixpenny piece, a thimble, a button, and a ring. The silver coin was prized for the wealth it promised ; the two following articles were feared for their forebodings of single-blessedness ; while the ring, most coveted of all, was regarded as prophetic of an early marriage.

“ Mak’ yer supper, bairns,” said the cantie hostess from the head of the table.

“ Nae fears o’ that,” responded Hughoc Tod. “ For mysel’, I’ve pat oot o’ sicht sae muckle chicken, that I’m thinkin’ every cock I meet for the next week will be crawin’ at me.”

“ A miserable joke, Hughoc,” said Alick Scott. “ Wha wud hae taen ye tae be sae chicken-hearted.”

“ Puir or rich,” replied Hughoc ; but jokes in general maun jist be accepted as Mrs Harvey there does the eggs o’ her poultry—guid or bad, as they chance to fa’.”

“ But what o’ this ghaist story, Alick,” asked Miss Ronald, “ that is being made so much o’ tae the ear-ringing, nae doubt, o’ Peggy and you ?”

Alick courteously shied the question, but Hughoc, with his usual loquacity, gave a graphic outline of the farce.

Alick had been ower at Barleyneuck spending a night with Peggy, and just when parting in the meadow fronting the cottage, his attention was arrested by a white object on the bastion of an adjacent hill. And what made matters worse, Alick had this hill to cross on his way home.

"What's yon?" said he to Peggy, pointing with trembling finger to the mysterious creature now scampering across the brae.

"Canna tell, but it looks unco like a——"

"Weel, jist oot wi't, Peggy," whispered Alick, "oot wi' the warst. Is't raily a ghaist think ye? And no——that it canna be! for see! it has a' the limbs at least o' ordinary flesh and bluid."

"I wadna like to say it's a ghaist, Alick," answered Peggy; "but sic disembodied visitors, I believe, *hae* been seen about the toon."

"Ghaist or diel," exclaimed Alick, drawing himself up to hero-height, "I'll be at his tail in a jiffey if he'll stand fire at a'." So, getting hold of a good stick, he requested Peggy to rest a minute, and then started off in pursuit. He had not, however, proceeded far when the vexatious imp came bounding down upon him with terrible action. Alick, seeing this aggressive freak, took nimbly to his heels. Yet, by and bye, he got crept round again to Peggy, pale and excited. And still the ghost was there; only a bit further down the hill. What was Alick to do? Screwing up the residue of his courage, he once more ventured out in arms against the apparition. But the mystery was at length to be solved. He had not got twenty paces from Peggy when the sportive ghost gave a loud bah! turning out to be nothing more spectral than a white calf which had strayed from the herd of a neighbouring farm.

An adjournment to the barn, as the scene of the dancing festivities, was now proposed.

“Tak’ tent,” said Glaucl Lindsay, “it’s my prerogative; and I move that afore we gang further we get ‘Sandy’s Mull’ frae Langlees.”

Old Nicol had no objection to give his guests the song, only “the leddies, he thocht, micht hae preferred something mair sentimental.” Let any fair reader judge:—

“ ‘Sandy, man, lend me your mull?’
Sandy lent the man his mull;
The man gat len’ o’ Sandy’s mull,
And the mull was lent by Sandy.

Sandy’s mull was three-pairts full
When Sandy lent the man his mull;
The man took wull o’ Sandy’s mull,
And toom’d the mull to Sandy.

Sandy glowered intull his mull—
‘My faix,’ quoth he, ‘she’ll bet a jull
She’ll lend nae mair her sneeshin’-mull
Sae lang’s her name is Sandy.’ ”

The leafy-busked granary reached, then followed a morning of the merriest din and diversion. Spirits on every hand, especially in the “Reel o’ Hoolachan,” were wildly boisterous, which gave the terpsichorean *fête* the character of an even fierce assembly. From the common heart of the glee-ful dancers came the jocund cry:—

“ Make the auld barn shake with laughter,
Beat its flooring like a drum;
Batter it with ‘Tullochgorum,’
Till the storm without is dumb.”

Hughoc's legs, according to his own confession, could not compose themselves for about a week after. This closing "act" of the foy, too, he called "the kissin' festival;" and further observed that so delicious were the smack favours that he did little else than lick his lips the whole day following. "The American Post" concluded the morning's merriment. You go to the door, of course, when called. You, in your turn, also knock; and as *Francisca* says—

"'Tis a man's voice, gentle Isabella,
Turn the key, and know his business of him."

Before parting the festal company retired for a short time to the cottage. When the ladies had got robed for the road, and again joined the gentlemen in the parlour, Glauf Lindsay started "Auld Lang Syne," which was sung as a concerted piece.

"We twa hae paidled in the burn," repeated old Nicol, after the music had ceased. "That brings back auld days, wi' mony fond recollections. On sic occasions as the present, my young freens, we wha are fast gaun tae the mools feel jist as gin time had receded—as gin the years had rowed back."

"I believe what ye say's a fac', Langlees," said Alick Scott; "but for a veteran o' auchty or thereby ye're yin o' the maddest and jolliest dowgs I ken. What wud ye say, amang the big bouk o' yer ither kindnesses, tae gae us youngsters—some few, gude kens, glum and dour enuch at times—yer recipe for what maun mak' life sae sweetly pleasant tae yersel' and a' about ye?"

Nicol, notwithstanding, his constitutional frankness, seemed bent on making no rejoinder. At last, however, just to change the subject evidently, he quaintly observed,

that “guid health, in his opinion, had mair tae dae wi’ guid temper, and *vice versa*, than was dreamt o’ in oor philosophy.”

Mrs Harvey, who had not “bent an e’e,” was also with us in spite of the early hour. She had kindly waited on to bid her guests a hearty adieu. Seeing Susan Sharp take the road to Auchengane on foot, the blyth and considerate old lady exclaimed—

“What ! what ! Allan Morrison, will ye raily let the lassuc gang hame on her feet through a’ that rain and mire ? Fa’ tae and yoke Donald i’ the dog-cart, and gie her a drive yont out-ower the clachan. Gracious me, bairns, I kenna what the young chiels o’ this generation are degenerat’in’ tae. Jist the year afore I marrit the guidman there—and weel I mind o’t as yesterday—he saddled a braw young cowl ae mornin’ after a party in his father’s ; and, grupp’in’ me up on ahint him, saw me safe landed at Cushatquarter ere he thocht o’ returnin’

Allan at once took the hint.

Over the best half of the way home to Hopedale we had again the company of Glaud Lindsay, and, in addition, that of Jean Forrester. There was a burn to cross at Tippetmains—the farm where Jean resided. Glaud did the amiable most gallantly.

“Noo, be tentie in your step lassie, and dinna get jaupit wi’ the glaur o’ the sheugh. Jist tak’ time, my dear. Nae hurry. Nae hurry. That’s it, Jean—a’ safe and soond, Good-bye, sweetheart, good-bye.”

